



Layers

full monitoring system currently being tested on pilot farms around Europe

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Second Welfare Quality® stakeholder conference

3-4 May 2007, Berlin Germany

‘Assuring animal welfare: from societal concerns to implementation’

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Programme Second Welfare Quality[®] stakeholder conference Berlin

Programme 3rd of May 2007

- 08.15 Registration
- 09:00 Meeting room: Martin Lerche Hörsal
Opening by Prof. Dr Andreas Hensel, President of the Federal institute for Risk Assessment, Berlin, Germany
- 09:15 Without animal welfare no agriculture is sustainable by Thijs Berman, member Socialist Group in the European Parliament, Committee on Agriculture.
- 09:40 Welfare Quality[®]: context, progress and aims, by Prof. Dr Harry J. Blokhuis (Animal Science Group of Wageningen UR, The Netherlands, and Swedish University of Agricultural Science, Sweden; coordinator of Welfare Quality[®])
- 10.10 **Session 1: Turning societal concerns into a welfare initiative**
Introduction by chair: Prof. Lawrence Busch (Michigan State University, USA)
This session addresses the concerns that society, and various stakeholders within it, currently have over farm animal welfare. The concerns expressed by various stakeholders and in policy initiatives are presented and the Welfare Quality project shows how such societal concerns can be included in the rationale behind a welfare assessment scheme.
- 10:15 Societal concerns on farm animal welfare, by Mrs Unni Kjaernes (The National Institute for Consumer Research, Norway)
- 10:40 Coffee – Tea break
- 11:10 Rationale behind Welfare Quality[®] assessment of animal welfare, by Dr Isabelle Veissier (Institut National de la Recherche Agronomique, France) and Dr. Adrian Evans (Cardiif University, United Kingdom)
- 11:35 The approach of the European Union, by Dr Andrea Gavinelli (Directorate General Health and Consumer Protection, European commission)
- 12:05 General discussion 'How to turn concerns into action in a way that is socially acceptable and economically viable.'
- 12:35 Lunch
- 13.45 **Session 2: Turning welfare principles into practice: approach followed in Welfare Quality[®]**
Introduction by chair: Prof. John Webster (University of Bristol, UK)
Session 2 concentrates in the Welfare Quality[®] approach and results so far. The monitoring scheme is presented and how that can be employed in a product information system. We also explore more concretely how that can be done in practice, as seen from farmers' and retailers' point of view, and the benefits that can come out of that.
- 13:50 Turning welfare principles into practice: approach followed in Welfare Quality[®], by Prof. Linda Keeling (Swedish University of Agricultural Science, Sweden) and Dr Bettina Bock (Wageningen University, The Netherlands)
- 14:15 Practical strategies to improve on-farm animal welfare, by Dr Xavier Manteca et al. (Universidad Autónoma de Barcelona, Spain)
- 14:40 Construction of product information from animal welfare assessment, by Raphaëlle Botreau (Institut de l'Elevage, France) and Dr Isabelle Veissier (Institut National de la Recherche Agronomique, France)
- 15:05 Exploration of strategies to implement welfare schemes, by Dr Andrew Butterworth (University of Bristol, UK) and Unni Kjaernes (The National Institute for Consumer Research, Norway)
- 15:30 General discussion on turning welfare principle into a practical monitoring system
- 16:00 Coffee - tea break

Posters prepared by Welfare Quality[®] partners on same topics as those for oral presentations will help prolong discussions during breaks

16.30 Workshops

Workshop 1 Improving welfare through product information

Meeting room: Martin Lerche Hörsal – Left entrance

Chair: Mr. Aldin Hilbrands (Royal Ahold, The Netherlands)

When promoting animal friendly products it seems logical to do so by providing relevant information on the product itself, preferably in a manner which is easy to read and speaks to consumers' imagination. On the other hand we know that consumers already complain about the amount and inconclusiveness of production information. Moreover, consumers seem to have little faith in the reliability of production information. They tend to distrust producers, manufacturers and retailers because of their vested interests and because it is often difficult to distinguish between objective information and advertisement. This workshop wants to discuss how production information could be provided in a way that warrants consumers' trust and interest in this information. One option is to integrate animal welfare in those existing production information systems that are among the highly trusted ones, such as those dealing with issues of sustainability and food safety. Again it is, however, pertinent that information about these issues is indeed highly reliable and perceived as such by consumers in order to safeguard the very basis of production information – its trustworthiness.

Workshop 2 How to reconcile producers and society on welfare grounds

Meeting room: D146

Chair: Prof. Joerg Hartung (University of Veterinary Medicine, Hannover, Germany)

Society increasingly worries about the welfare of animals in modern farming and fears that animals' needs are ignored for the sake of production. Farmers consider that they know how to treat animals and to take good care of them. In the same time they feel blamed for the effects of modern agriculture that society itself supports for the sake of cheap food. This workshop wants to deal with the opportunity to realign farmers and society in their interest of taking good care of animals. It is an interest they share, although they may define and perceive animal welfare in different ways. Specific animal welfare production schemes seem to offer the opportunity for a cooperative approach and a good starting point for a new dialogue about how to combine and respect both – society's concerns for animals and farmers' professional knowledge and interest. Among others, this requires a discussion about the definition of animal welfare and its various dimensions. In addition, an exchange about the value of animal welfare in terms of food quality and price is essential, as well as an agreement about how the costs of animal friendly production could be shared across the whole food chain.

Workshop 3 Globalising animal welfare

Meeting room: Martin Lerche Hörsal - Right entrance

Chair: Mr. Brian Marchant (Directorate General Trade, European Commission)

Food chains are globalizing and so are the production, manufacturing and trade in animal products. Meat produced in Europe is exported to Japan and chickens raised in Brazil are sold in Europe. The globalisation of animal production and trade and resulting competition of producers and retailers on the world market, makes of animal welfare a global issue as well. One of the major concerns of European farmers is the increasing competition with foreign products produced under lighter animal welfare regimes and imported by the very same retailers that enforce stringent regulations on European farmers as part of retailers led production schemes. But competition on animal welfare is also taking place within Europe, where as a result of the common market farmers from member-states with lighter regulations may enter more heavily regulated markets through the backdoor. Equalizing national legislation and regulation in order to realize a level playing field within the EU market and preferably at global level is the pressing demand of farmers throughout Europe. Costly animal friendly production needs protection against the import of cheap and animal unfriendly production in their view. This is another demand of farmers to national and European governments – to make sure that also imported products have to live up to the same production rules and norms. Both demands, however, touch upon the core of the retailers' liberty and the profitability of agricultural trade. This workshop wants to encourage a discussion about the question how to safeguard farm animal welfare on a global scale in a time of trade liberalisation and globalisation.

18.30 End of Workshops

19:00 Dinner at the conference location

Programme 4th of May 2007

- 9.00 Meeting room: Martin Lerche Hörsal
Session 3: Animal welfare schemes as key elements for society
Session 3 turns to how society at large can adopt a welfare scheme. Main issues addressed will concern are the challenges a welfare scheme may face, the improvements expected from a welfare scheme, and the cost/benefit considerations involved.
- 09:00 Introduction by chair: Prof. Bosse Algers (Swedish University of Agricultural Science, Sweden)
- 09:05 Animal welfare and certification schemes: the view of animal protectors, by Mr. Dil Peeling (Europgroup for Animals)
- 09:30 Retailers dealing with welfare schemes, Dr Paul Ingenbleek (Wageningen University, The Netherlands)
- 09:55 Challenges experienced in practice when implementing a welfare scheme, by Mr. Keith Kenny and Mr. Patrik Holm Thisner (McDonald's Europe)
- 10:20 Coffee- tea break
- 10:50 Benefits and costs of improved animal welfare, by Dr Ina Enting (Animal Sciences Group of Wageningen UR, The Netherlands)
- 11:15 General discussion on difficulties, costs and benefits of implementing strategies in animal welfare
- 11:45 Synthesis of workshops: Summary of each workshop and discussion
- 12:45 Conclusive remarks, by Dr Tim Hall (Directorate General Biotechnologies, Agriculture and Food, European Commission)
- 13:00 End of the conference

Abstracts of communications

Welfare Quality®: context, progress and aims

Harry Blokhuis, Animal Sciences Group, Wageningen University and Research Centre, The Netherlands

Some five years ago we started to formulate the first aims and goals of what became the largest piece of integrated research work yet carried out in animal welfare in Europe. The Welfare Quality® project has now been running for three years and it has been an exciting and very productive time. We are also making a global impact. For example, the Welfare Quality® consortium was recently extended to include four Latin American partners, so we now have a total of 44 partners from 17 countries.

Although the originally formulated goals have evolved as results emerged and as opportunities arose, the main aims still stand:

- to develop practical strategies/measures to improve animal welfare,
- to develop a European standard for the assessment of animal welfare ,
- to develop a European animal welfare information standard,
- to integrate and interrelate the most appropriate specialist expertise in the multidisciplinary field of animal welfare in Europe.

A starting point of Welfare Quality® was that consumers' perception of food quality is not only determined by its overall nature and safety but also by the welfare status of the animal from which it was produced. In other words, animal welfare is an important attribute of an overall 'food quality concept'. Recent surveys carried out by the European Commission (e.g. Eurobarometer, 2005¹) as well as studies within Welfare Quality®, confirm that animal welfare is an issue of considerable significance for European consumers and that European citizens show a strong commitment to animal welfare.

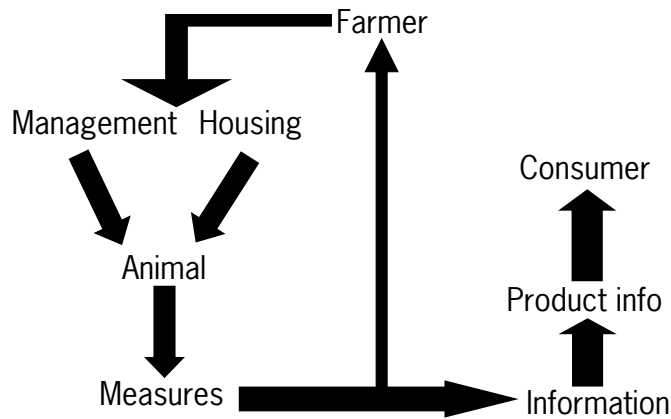
When formulating the Welfare Quality® approach we also built on results from a sociological study carried out in Europe that included an analysis of consumers' reluctance to purchase animal friendly products (Miele and Parisi 2000; Harper and Henson 2000). This study revealed that an important reason is the lack of transparent, reliable and easily understandable information about the way in which animal-based food products are actually produced. The Welfare Quality® project therefore set out to develop scientifically based tools to measure animal welfare and to convert these measures into accessible and understandable information.

These measuring tools need to be scientifically valid, to address welfare concerns and to allow clear communication about the animals' quality of life and profiling of products in order to connect animal husbandry practices to informed animal product presentation and purchasing. In a truly integrated effort Welfare Quality® combined analyses of consumer/citizen perceptions and attitudes with existing knowledge from animal welfare science and thereby identified 12 areas of concern that should be adequately covered in the measurement systems.

To address these areas of concern, we decided to concentrate on so-called performance measures that are based on measuring the actual welfare state of the animals in terms of, for instance, their behaviour, fearfulness, health or physical condition.

¹ Attitudes of consumers towards the welfare of farmed animals,
http://europa.eu.int/comm/public_opinion/archives/ebs/ebs_229_en.pdf

Such animal-based measures include the effects of variations in the way the farming system is managed (role of the farmer) as well as specific system-animal interactions (see diagram below).



Diagrammatic representation of the measuring and information systems (adapted from Blokhuis et al. 2003).

Design measures are also included so that causes of poor welfare can be identified and remedial measures proposed (feed-back to farmer). For each of the different species about 20-30 measures were selected for inclusion in the first pilot systems that will be applied in practice this year. These measures had already been analysed within Welfare Quality[®] for validity, repeatability and feasibility and, whenever, necessary, additional research was carried out. On the basis of this year's on-farm trials, further selection of parameters and fine-tuning of the systems will take place.

In the conception phase of Welfare Quality[®] it was recognised that a large European effort in the area of animal welfare should also include research designed to identify practical ways of solving some of the main welfare problems in current animal production. Therefore, we initiated appropriate studies in important areas like handling stress, injurious behaviours, lameness, temperament etc.. I'm pleased to say that some very relevant and interesting results are already emerging. The practical improvement strategies that these studies are generating will provide valuable support to farmers and the animal industry in their efforts to improve animal welfare. Since these studies are an integrated part of the Welfare Quality[®] approach they will also inform and be guided by the information emanating from the development of our welfare monitoring systems (see diagram below).

Clearly, the ultimate use and implementation of the monitoring and information systems as well as the improvement strategies are dependent upon many different actors, drivers, trends and opportunities, such as the producer, breeding, retail and food service industries, citizen's engagement, NGOs activities, political developments at EU or global levels, and market developments. Therefore, the Welfare Quality[®] project is also developing a wide range of activities to support the implementation of the results. These include stakeholder workshops and demonstration activities that will take place during the last two years of the project.

Our involvement of a number of stakeholders and independent academics in advisory roles (Advisory Committee, Scientific Board) helps ensure that these activities are timely, relevant, effective and widely acceptable.

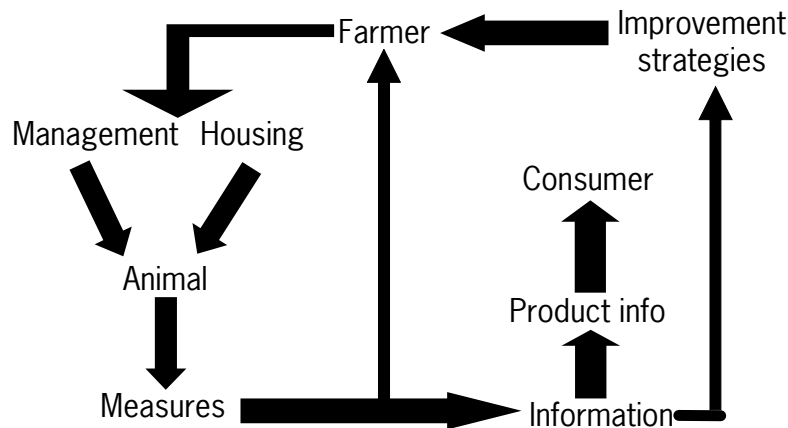


Diagram illustrating integration of improvement strategies in the Welfare Quality[®] approach (adapted from Blokhuis et al. 2003).

Population surveys were carried out to explore in more detail the extent of social engagement in farm animal welfare issues in different countries and how this engagement is reflected in everyday consumption practices across several European countries. Moreover, studies of the supply chains for welfare-friendly products and the motivation for and barriers to participation in welfare schemes by farmers in these countries were carried out. Clear differences between countries were apparent so the Welfare Quality[®] scientists built on this information to formulate strategies to implement welfare schemes under specific conditions of consumer/citizen, distributor and producer expectations.

Now that the measuring systems are being constructed, considerable effort will be given to describing these methods and techniques, and to work with a formal standards setting body to create the basis of future technical standard documents. Legislators in Europe have already identified the potential importance of such harmonised standards in the setting of future European legislation.

Work has also begun to produce high quality training material to facilitate the uptake of the techniques that will be used to assess animal welfare. This material can be used by stakeholders, farmers' groups, certification bodies and researchers to train personnel in the use of these techniques.

Retailers and producers are increasingly recognising that efforts to meet consumer concerns and requirements in the animal welfare area actually represent a business opportunity and may thereby be profitably incorporated in the production strategies of any agri-food company or chain. This also relates strongly to the growing recognition that conditions that can negatively affect animal welfare may also damage other quality aspects. For example, distress increases the occurrence of: tough or watery meat, bruising, abnormal eggshells as well as compromising health and productivity..

Companies are therefore exploring the application of animal friendly husbandry systems, management practices and breeding strategies, the implementation of monitoring and certification schemes, and the communication of the associated information to the consumer (e.g. communication via branding and labelling).

This movement obviously links to the core activities of Welfare Quality[®] and we are therefore attempting to create opportunities, (e.g. Stakeholder Workshops, European Animal Welfare Platform,) to support a bilateral exchange of knowledge with these stakeholders that would effectively extend the relevance and impact of Welfare Quality[®] research, results and recommendations in industrial food supply chains. Of course, such dialogue can also benefit citizens, government and industry by strengthening the sustainability and competitiveness of European agriculture. We hope to intensify these efforts through support from the EU seventh Framework Programme for Research and Technological Development.

Now that 60% of Welfare Quality's running time has passed, we need to look forward and ensure the best conditions to support the application and implementation of our results. As mentioned earlier, much of the Welfare Quality[®] work in the next two years will not just focus on the further development of the welfare measurements and improvements strategies but also on establishing a range of implementation strategies and tools to support the effective use of the outcomes. In this way the project itself creates a good basis for consolidation, implementation and further development of the results. However, in my view there is an urgent need for an independent and respected body to manage and maintain the welfare assessment and product information standards that will be delivered by Welfare Quality. I further believe that the establishment of a European Centre for Animal Welfare as suggested by the European Commission in their 'Action Plan on Animal Welfare'² could make an enormous contribution to this.

Acknowledgments

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² Communication from the Commission to the European Parliament and the Council on a Community Action Plan on the Protection and Welfare of Animals 2006-2010. COM (2206) 13 final, Brussels

Societal concerns on farm animal welfare

Unni Kjaernes, The National Institute for Consumer Research (SIFO), Norway
Emma Roe, Cardiff University, UK
and
Bettina Bock, Wageningen University, the Netherlands

Mapping societal concerns

The Welfare Quality[®] project integrates animal science with societal concerns to identify standards and measures for improved animal welfare. We consider the views of major actors in the food chain, namely farmers, consumers, processors and retailers. Since societal concerns can only be interpreted in regard to their social context we have studied the varying regulatory, commercial, social and cultural conditions in 7 countries thus identifying variations in farming systems, distribution structures, socio-economic conditions, etc. By collating this information, we can produce a detailed and dynamic picture of opinions and practices regarding farm animal welfare across Europe.

In Welfare Quality[®] we have studied the views, practices and institutional conditions at the level of production, retailing, and consumption in France, Great Britain, Italy, the Netherlands, Norway, and Sweden, including consumer studies research in Hungary (Miele and Roex, 2005 and Kjaernes, Miele and Roex, 2007). The producer study has interviewed pig, cattle and poultry farmers on conventional farms and farms involved in assurance schemes (quality, organic, animal welfare). The study of retailing systems has followed up on this attention towards assurance schemes, by carrying out an audit of the types of labels with relevance and reference to animal welfare, succeeded by interviews with key actors, with a particular focus on market response to farm animal welfare. Finally, a series of focus group interviews as well as representative telephone surveys have explored how animal welfare relates to food purchases and eating practices.

In order to capture consumer/citizen concerns on farm animal welfare, it is important to leave the technical and scientific terminology behind and ask very openly whether farm animal welfare is an issue and a problem that society should care about, what in particular they are concerned about; how problems are framed and explained, and finally, who they see as responsible for taking the initiative. The retailers/processors research meanwhile necessarily has had to discuss the technical issues around farm animal welfare within a commercial context of knowledge and experience of animal welfare.

There is increasing presence in the media, emerging consumer/citizen interest in ensuring good farm animal welfare, and growth in commercial initiatives led by farmer cooperatives and/or retailing and processors. However, we find many different motivations reflected in the commercial initiatives by producers and the food-industry operating alongside a range of expressions of consumer/citizen concern.

Consumers' perceptions of welfare

Many people acknowledge animal welfare as an issue, often associating poor welfare with industrial farming techniques (and as a corollary, associating good welfare with smaller scale agricultural enterprises). Modern transport and slaughtering methods are also often met with worry. But a majority are optimistic about the development in their own country.

And the concerns cannot be said to drive consumption behaviour to any large extent, in particular if judged by the demand for particular animal-friendly foods (Kjaernes and Lavik, 2007).

Many seem to have very wide and general ideas about what a "welfare-friendly purchase" is. The most generalised approach is an overall approval of production systems and/or regulations in their own country. The focus on production systems is also reflected in the popularity of free-range systems for egg and broiler production. There is a clear differentiation in welfare concerns between species; poultry production is perceived as most industrialised and intensive, resulting in poor welfare, followed next by pig farming, and then dairy farming. Ranked at the top in welfare terms are species associated with extensive production systems, for example, lamb meat in Norway and the Mangalica pigs and grey cattle in Hungary.

There is a relatively common association of animal welfare with product quality, especially prominent in France, but visible also in many of the other countries. Quality products (for the most part those that are thought of as having a superior taste) are widely assumed to result from production processes that exhibit higher levels of welfare. Often a link is also made between healthy products and increased levels of welfare. The idea of 'good for animals, good for humans' is widespread everywhere, but seems to be particularly emphasised in Italy, Hungary, and France.

There is, nevertheless, a gradual shift in attitudes and a growing awareness of welfare issues. This is partly prompted by animal welfare organizations and by the recent food scares but also by the dramatic growth of quality labelling, notably including organic. For some, especially in Northern Europe, quests for animal friendly food are, associated with a more critical and active consumer role.

Retailers' perceptions of welfare

Across Europe, we find highly variable commercial strategies for animal welfare issues among retailers. While animal welfare generally does not currently present a commercial opportunity in Norway and Hungary, in contrast it is a well established commercial strategy amongst British and Dutch retailers, and features as part of more quality-embedded strategies in France. Sweden is developing a commercial strategy comparable to the UK and Dutch model, whereas animal welfare is emergent in Italy along similar lines to the French model (Roe 2007).

Animal welfare is 'sold' in a variety of forms by the retailers and manufacturers investigated in this research. For many welfare is considered part of a commercial strategy to illustrate concern for the environment and sustainability and supporting their 'brand' image. Where higher welfare production standards were met it was only advantageous to market these products for the higher valued parts of the carcass. This practice is carried out with recognition for different values placed and thus willingness-to-pay-more for some meat cuts more than others; along with a commercial need to offer a range of products of different qualities in a product category.

It is important to note the strong emphasis upon the economic sustainability of the means of production.

The phrase *'there is no packaging or marketing difference for the final product produced to a higher welfare standard'* is critical to understanding the difficulty of promoting a 'welfare label'. In the absence of a strong ethical consumerism, without a perceptible difference in product quality, market actors see no opportunity for a market segmented *solely* by welfare concerns. Hence, for the majority of retailers welfare needs to be bundled as a component of general product quality (e.g. gustative quality).

As a commercial 'strategy', animal welfare is clearly not, by itself, a viable reason for product segmentation. However, welfare is becoming increasingly adopted as a component in a broader reconfiguration of notions of quality; this both in response to perceived consumer concerns but also as part of retailers' own commitment to 'quality' and 'environmental' and other more overtly 'ethical' practices. Particularly in France (and Italy), the understanding of 'quality' is extending beyond the product to the entire chain and the actors involved in it under a process of what we might term 'quality modernisation' which incorporates elements of ecological modernization (through references to environment and sustainability) but also ethical modernization.

Retailer initiatives concentrating particularly on animal welfare standards are much more rare and concentrated mainly in the UK, to some degree in the Netherlands. A dominant strategy is, especially for quality retailers, to include such standards as part of their branding strategy, in order to improve legitimacy and reputation. In effect these retailers have become heavily involved with industry assurance schemes and by doing so are reducing the need for them to run their own assurance scheme through buying product exclusively from these assurance schemes. With the control that British supermarkets have over the supply-chain they can ensure that standards can be implemented relatively easily. Whereas the producer-led Label Rouge scheme in France have not developed the same relationship with retailers they are equally valuable in involvement with initiatives which include animal welfare criteria.

The findings from this study also indicate that within the European dairy and livestock market the development of retailer own-brands that have started to embrace quality and safety standards have led to the reduction of explicit marketing of assurance scheme standards. The relationship that assurance schemes have with consumers is becoming increasingly confused in Europe as retailers choose not to use logos or use logos that do not give a clear picture to the consumer about what standards the products meet. The moves particularly by UK retailers to reduce the use of non-mandatory independent labels (exception is the mandatory Organic certification body label) about production standards can be linked to two trends. Firstly their brand is used as a logo/ symbol for everything being okay. Secondly, new logos are coming up related to healthy food in terms of fat etc. which are using up packaging space for other labels. Consequently labels are used as a market segmentation strategy which pushes regulating compliance to assurance scheme standards back towards a predominantly industry concern as opposed to one which consumers can engage with. This leads to a large amount of meat and dairy products that are produced to higher animal welfare levels than EU minimum standards but which are not labelled as such. However where the retailers are less dominant the place of the label is still thriving on product packaging produced by manufacturers or farming cooperatives. This development makes increasing sense as the meat supply chain from suppliers to major retailer is increasingly integrated.

Farmers' perception of welfare

Farmers consider looking after their animals and ensuring their wellbeing an essential aspect of their job. They insist upon the need to satisfy physiological needs of the animals, their health but also general conditions (comfort, the ambience in the farm buildings) and psychological aspects (absence of stress, good relations between humans and the animals).

Depending upon the type of production, they additionally insist on freedom of movement, access to fields and outside grazing areas. For organic production, this can also include respect of natural conditions and cycles. Overall, they stress the importance of observing their animals and their performance, in order to judge the level of welfare on their farms. They also wish for more recognition of their professional knowledge and engagement in animal welfare and often feel blamed and stigmatized.

But interviews with farmers demonstrate large variations in views and concerns between countries, between different husbandry sectors, and between farmers with conventional systems as compared to those implementing assurance schemes. The importance and types of schemes are also highly variable across countries (Bock 2007).

Generally speaking, farmers in specific animal welfare and organic schemes are more ready to accept and implement new measures than farmers in basic and top quality assurance schemes are. This is partly related to their different definition of animal welfare and partly related to the specifications of their schemes. Several farmers in animal welfare/organic schemes have already had to implement the measures we proposed as additional animal welfare measures. Some of the new measures do not attune to the definition of farmers in basic and top quality assurance schemes (e.g. the introduction of straw beddings might put animal health at risk by reducing hygiene and sanitation). It is important to understand that hesitation to integrate new measures does not necessarily imply that animal welfare is not important to farmers but that the specific measure might conflict with farmers' definition of animal welfare and their ideas about good farming practises.

Many farmers feel under pressure, economically as well as socially. They are expected to comply with more stringent regulations and to produce in a more animal-friendly way. But in their view nobody wants to share in the extra costs this implies. Many farmers distrust the processing industry and retailers and doubt if their engagement in animal welfare is really more than window-dressing. Farmers in basic and top quality schemes have little faith in consumers' willingness to pay and worry about consumers' lack of knowledge for what concerns animal welfare and quality of production. Farmers who participate in specific animal welfare and organic schemes have slightly higher expectations of consumers, stimulated by their success to enter specific niche markets.

Underneath the different attitude of the two groups of farmers towards animal welfare issues lies a more fundamental difference in farming style or production logic. The majority of the first group of farmers produces meat for the conventional market where the price is low and profit depends on selling large quantities of meat and on cost reduction. In this context a good farmer is an efficient farmer. In this context defining animal welfare primarily in terms of animal health and zoo-technical performance makes sense. When the objective of agriculture is more broadly defined and includes issues like care for nature and environment, such as in the organic scheme, the definition of good farming and good animal welfare will concomitantly change as well. In this context 'naturalness' and natural behaviour are considered more valuable. Specific animal welfare schemes and organic farming provide a context where such behaviour is stimulated and rewarded by a premium price that compensates the higher costs involved. Farmers in basic and top quality assurance schemes are on the contrary obliged to increase production in order to make up for the costs resulting from more stringent animal welfare regulations. They often have to make investments that in their view add nothing to animal welfare and do not increase the economic value of their products. The markets where their products are sold are generally not ready to reward their engagement by premium prices.

Changes taking place across Europe

There are both common tendencies across Europe, as well as considerable variation. Some of this variation can be associated with different public agendas or “national cultures”. However, importantly, this diversity of opinions and concerns can often be traced back to the specific situation and institutional conditions in which they emerge.

When combining our studies of farmers, retailers, processors, and consumers, we see common features, expressing some degree of national consensus – or controversy. One issue is the different organisation and regulation of animal welfare, either by way of the market or by way of the state. This framing influences farmers’ attitudes and perceptions and ultimately their perceived behavioural opportunities and choices. Regulating animal welfare by way of the market offers some farmers the opportunity for distinction in the market. The possibility to sell those products and to cope with the competition of foreign products depends among others on the openness of the national market. When animal welfare is regulated by the state and by way of strict animal welfare regulations all farmers have to comply and the welfare of all animals will consequentially improve.

Norway and Sweden provide a specific context as animal welfare is strictly regulated by law and only few animal welfare schemes exist. The other four countries are proponents of a more neo-liberal governance style where public issues are resolved by way of the market against a background of different national legislative levels and retailing structures from centralised in the UK to regional in the case of Italy and France. As a result, animal welfare schemes or quality product schemes (which include animal welfare) are more prominent where public interest in animal welfare as a food quality is high enough to expect sales of animal friendly products to be successful. This is the case in The Netherlands and the UK and to some extent France. Where public concern for animal welfare is less, e.g. Italy, there is little need for the market to develop initiatives. Yet even here select groups of farmers are working to higher welfare standards e.g. for retailer Coop Italia, or to produce typical quality products. The fragmented farming and retailing structure in Italy appears to make it harder to ensure conformity with minimum legal standards, since there is no need to be part of a scheme to gain market access as in other countries. The UK represents a special case as it has a high level of animal welfare legislation and quite a few quality assurance schemes which publicise their animal welfare component as well as a dedicated animal welfare scheme. In the UK farmers are also especially under pressure – socially as well as economically, since the vast majority of British retailers only accept domestic meat produced under British top quality schemes. At the same time farmers have to compete with a large amount of imported meat, produced under lighter animal welfare regulations.

Consumer experiences and expectations are highly variable depending upon these different situations. In many ways consumer experiences and expectations are shaped by what the market offers them and the interest amongst farmers, industry, food retailers, media, NGOs, and state-legislation at varying national levels which brings farm animal welfare to the fore. The situation is far from stable and indeed attention towards farm animal welfare is increasing in various ways in all situations, particularly as reflected in a growth of attention towards market based initiatives to improve animal welfare. Yet it is clear that most of these retailer and/or producer led initiatives end up being publicised as a label on a select few or none of the products from the animals produced to higher standards. Push for improvements may come from social mobilisation on animal welfare, but under current circumstances it is difficult to see how demands for reforms to any large extent can be channelled through what people purchase.

Acknowledgments

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Rationale behind the Welfare Quality[®] assessment of animal welfare

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Ensuring the welfare of animals that produce products for human consumption requires means to reliably assess animal welfare and to inform - in a standardised way - producers, retailers, consumers, animal protectors, and a range of other citizens. To date no unique measure of welfare exists. This is essentially due to the fact that welfare is a multidimensional concept. It comprises both physical and mental health (Dawkins 2006; Webster 2005) and includes several aspects such as physical comfort, absence of hunger, diseases, or injuries etc. (Farm animal welfare Council 1992). The importance attributed to different aspects of animal welfare may also vary between people (see Fraser 1995). These specificities of the welfare concept make its assessment a difficult exercise. First the different aspects of welfare to be covered must be stated clearly. They should reflect what is meaningful to animals, as understood by animal welfare science, but also be agreed by stakeholders, in order to ensure that wider ethical and sociological issues (such as the contextual nature of both human-animal relationships and scientific forms of knowing) have been dealt with and that the monitoring scheme can be successfully put into practice. Once agreement is reached on these aspects, science can help develop measures to assess them. Finally, the relative importance attributed to each welfare aspect should, in an ideal world, reflect the priorities of animals. However, because these priorities are difficult to ascertain, the aggregation of welfare measures into an overall assessment of welfare has to rely on expert opinion on what counts for animals and what societies find acceptable/unacceptable.

Defining a set of principles that need to be covered to fulfil animal welfare

The overall assessment of animal welfare requires a multicriteria evaluation. The set of criteria that are selected to assess welfare must comply with various theoretical and practical requirements (Bouyssou, 1990). The set must contain all important criteria but no redundant or irrelevant criteria, one must be able to interpret each criterion separately and there should be no functional links between criteria. Finally stakeholders should consider the set of criteria as a sound basis for operating a practical assessment.

We reviewed the existing literature on animal welfare needs and applied the following guidelines:

- Welfare criteria should be applicable to all farm animal species;
- Criteria should be grouped according to how they are experienced by animals. For instance, poor resting areas may lead to abnormal behaviours and to injuries, with the former resulting in discomfort and the latter in pain. Hence, these two aspects are considered separately. In contrast, injuries, whatever their cause, are grouped together because they all result in pain;
- Trade-offs within a given criteria may be allowed but these should be limited between items, for example good human-animal relationships do not compensate for a lack of social contact between animals (Raussi et al., 2003).

As a result of this process twelve welfare principles were identified, these were subsequently grouped into four main criteria to ease their aggregation within the overall assessment (Botreau et al, in press; Table 1). These principles should be valid throughout an animal's entire lifespan.

Indeed, farm animals are often moved between different environments during their life and experience different conditions (e.g. rearing often occurs in less intensive environments than production). At least three major periods can be distinguished: the *rearing period*, which runs from birth to weaning, or the beginning of production (e.g. milk, eggs); the *production period*, during which a dairy animal will produce milk, a hen will lay eggs and animals farmed for meat will be fattened; and *the end of the life of the animal*, where it will be transported and slaughtered (we are aware of other intermediary periods, such as the pre-fattening of pigs and transport between rearing and production units, however these could not be considered at this stage in the project). At present, the Welfare Quality[®] assessment scheme covers all three major periods described above, however for products, such as milk and eggs, where the animal need not be killed, the monitoring system may not be able to take into account the end of the life of the animals.

Table 1: Welfare principles and criteria identified in Welfare Quality[®]

Welfare criteria	Welfare principles	Meaning
Good feeding	1. Absence of prolonged hunger	Animals should not suffer from prolonged hunger
	2. Absence of prolonged thirst	Animals should not suffer from prolonged thirst
	3. Comfort around resting	Animals should be comfortable, especially within their lying areas
Good housing	4. Thermal comfort	Animals should be in good thermal environment
	5. Ease of Movement	Animals should be able to moving around freely
	6. Absence of injuries	Animals should not be physically injured
Good health	7. Absence of disease	Animals should be free of disease.
	8. Absence of pain induced by management procedures	Animals should not suffer from pain induced by inappropriate management
	9. Expression of social behaviours	Animals should be allowed to express natural, non-harmful, social behaviours.
Appropriate behaviour	10. Expression of other behaviours	Animals should have the possibility of expressing other intuitively desirable natural behaviours, such as exploration and play
	11. Good human-animal relationship	Good Human-animal relationships are beneficial to the welfare of animals
	12. Absence of general fear	Animals should not experience negative emotions such as fear, distress, frustration or apathy

Stakeholders' reactions to the scientific monitoring scheme

One of the key characteristics of the Welfare Quality[®] approach to animal welfare assessment is that it is open to the views of different stakeholder groups (e.g. farmers, consumers, retailers, NGOs, policy makers etc). Stakeholders are valued both for their vital roles in implementing any proposed schemes and also for providing input into broader ethical issues surrounding welfare (see also Fraser 1995, Appleby and Sandoe 2002). As part of this consultation process the 12 principles outlined above were proposed to the Welfare Quality[®] Advisory Committee. In addition, 55 consumer-citizen focus groups were conducted across France, Hungary, Italy, the Netherlands, Norway, Sweden and the UK (Miele and Evans 2005). The research indicated that there was a great deal of societal support for the scientific monitoring scheme. As one Italian consumer stated: "The categories selected ... represent what we have said but in a deeper way". However, there were some important differences between consumer-citizen animal welfare concerns and those of the Welfare Quality[®] scientists:

- (1) The Welfare Quality[®] assessment scheme focuses on animal-based measures, as such it does not make a priori judgements about the welfare credentials of different farming systems but rather sees this as an empirical question to be investigated. In contrast consumer-citizens believe that low intensity farming systems can provide better animal welfare than high intensity industrialised systems. This is due to concerns about; space, freedom, the ability of farmers to fulfil their roles as animal carers in 'industrial' contexts, the problems of extreme breeds (broiler chickens, cows) and the over-use of medication. As one Hungarian consumer stated: *"And their forms of behaviour. Because I'd say that means playing, flying, running around. How would that be possible in an industry?"*
- (2) Consumer-citizens consistently point to the importance of providing natural environments for farm animals. Whilst certain elements of this naturalistic view appear to be naïve (e.g. idyllic images of green fields, meadows and mountains) other elements reflect a more nuanced appreciation of the advantages and disadvantages of outdoor living, the importance of allowing animals to perform natural/instinctual behaviours, and the benefits of having animals that are 'fit for their environments'
- (3) Consumer-citizens tend to adopt a holistic approach to animal welfare and they are less willing to break welfare down into, what they consider to be, artificial component parts. Furthermore, many reject the idea that it is possible to rank welfare concerns, as they are all deemed to be equally important and intimately connected.
- (4) Consumer-citizen understandings of what counts as good animal welfare are far less circumscribed than scientific understandings. For example, consumers inextricably link issues of animal welfare with issues of environmental sustainability, food quality/taste and human health (e.g. concerns about genetically modified animal feeds and human health).

Reconciling scientific and societal views on animal welfare

Within the Welfare Quality[®] project every effort was made to reconcile scientific and societal understandings of animal welfare. This was achieved largely through sustained discussion and debate between natural scientists and social-scientists working on the project. It is also important to note that many of the concerns/issues raised by consumer-citizens had already been discussed and debated within the natural scientific community, albeit using more technical terminologies. In particular, extensive discussions took place within Welfare Quality[®] on whether the monitoring system should be based on measures taken from the animals' environment (housing, feeding, etc.) or directly from the animals themselves (health, behaviour, etc.). A point that seems to reconcile all views is the notion that animals should not suffer. Hence, it appears more appropriate to develop animal-based measures, which attempt to assess welfare from the animals' point of view. Nevertheless, in parallel to animal-based measures, the Welfare Quality[®] project will also be developing a series of environment-based measures, which will help diagnose the causes of poor welfare and advise farmers on ways to improve the welfare of their animals.

Nature was also an important point of discussion. Natural environments probably offer more freedom to animals but also expose them to dangers (e.g. predators) and discomfort (e.g. warmth, rain etc.). Furthermore, certain natural behaviours are associated with stress (e.g. flight from predators). Hence we decided to consider only natural behaviours for which the animals seem to be motivated (e.g. movement, social interactions).

The holistic view of animal welfare is probably the most difficult to handle.

However, it does not contradict the view that animal welfare is a multidimensional concept nor does it devalue any of the 12 proposed principles. The holistic view of animal welfare requires that all dimensions of welfare are taken together and that an animal unit can only be found to be welfare-friendly if all principles are fulfilled (e.g. good health cannot fully compensate for behavioural deprivation). This view has been taken into account in the Welfare Quality[®] monitoring system, firstly by developing a way of assessing welfare that aims to cover all the different aspects of welfare and secondly by developing a method of aggregation in which great caution has been taken to limit compensations between different welfare principles (see Botreau et al., in this vol.).

Finally, the fact that consumer-citizens bundle animal welfare with other issues will certainly impact on the strategies proposed to implement Welfare Quality[®] results.

Conclusion

Welfare Quality[®] aims at developing monitoring and information systems based on scientific knowledge and in accordance with societal expectations. The way the rationale for monitoring welfare is translated into measures on animals or the environment is presented by L. Keeling and B. Bock and the construction of the overall assessment is presented by R. Botreau et al.

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Animal Welfare Labelling: Competitiveness, Consumer Information and Better Regulation for the EU

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Labelling is everywhere. In the EU, there are many rules affecting labels, and there is much debate about the proper use of labels and the best parameters for labelling. Labelling is an important market tool which should be viewed as an integral part of communication between societal players (business to consumers, directly and via intermediaries, authorities to consumers, etc.). Labelling is no longer the only reliable route for communicating information to the consumer, as it once was. But it remains an effective tool.

Retailers and producers are increasingly recognising animal welfare as a fundamental aspect of product image and quality which creates a need for reliable systems for on-farm monitoring of animal welfare status and providing guarantees on appropriate production conditions. Independent animal welfare audit programmes promoted by processors, retailers and multi-national corporations are becoming increasingly commonplace both in the EU and beyond. EU marketing standards for both eggs and poultry meat already contain various rules relating to animal welfare labelling.

At present two particular trends are noticeable: the coexistence of mandatory or voluntary schemes that are going beyond the minimum standards established in EU legislation, as well as confirmation from market trends that an increase of sales in sustainable derived products is achievable in many countries worldwide. Both of these trends are clearly facilitating a continued improvement of the animals' welfare conditions although the provision of additional information to consumers is required in order to better understand the added value of the welfare standards applied to each product and to facilitate their purchasing choices.

The establishment of an EU label for animal welfare is becoming an option to be investigated in the near future which could promote products elaborated under high welfare standards thus facilitating the choice of the consumers between products obtained with basic welfare standards (the minimum standards laid down in EU legislation) or with higher standards (contained in voluntary codes of practice or Member States' legislation going beyond EU minimum rules).

A clear label identifying the "level" of welfare applied could represent an effective marketing tool as currently used for the identification of certain agricultural products with particular regional attributes. Such a system of classification will need to be based on standardised scientific indicators well recognised both in the EU and internationally, and underpinned by research, in order to facilitate the marketing of these products.

DG SANCO action on labelling should take account of the broader context of communicating with the consumer.

The strategic goal is to have an overall approach for labelling which will;

- provide consumers with necessary information to enable them to make safe, healthy and sustainable choices.
- create a pro-competitive market environment in which dynamic, efficient, innovative operators can make full use of the power of labelling to sell their products.
- be consistent, coherent and transparent.
- create common framework and rules in order to eliminate barriers to free circulation of goods.

We could say here that the whole concept of the European Welfare label is embedded in the "Welfare Quality" work and it could represent the ground where to cultivate and further develop the ideas and the scientific outputs of the Community project that is now leading the new way to approach welfare science in Europe.

In order to support the consumers' desire for choice with objective and scientifically based information, and in the light of numerous sometimes competing or even confusing labels and standards, a specific "European Quality Standard" should be developed based on the ongoing research work.

Furthermore "Welfare Quality" outputs will support the Commission work to further investigate the issue of consumer concerns and to increase awareness among the general public on production methods used for farm animals, alternative practices applying higher animal welfare standards and the consequences for the economic viability of the farming activities.

Interaction between stakeholders is of particular importance in this phase of development to secure success to the initiative in the next years and to secure European leadership.

The "European Animal Welfare Platform" established in the framework of Welfare Quality around one year ago demonstrated immediately its importance and has convinced the Commission to launch a call under FP7 to support the development of a similar initiative independent from Welfare Quality and with specific resources in the next years.

Such an initiative allied with the tools of improved information to consumers and clearer marketing-labelling of products offers the prospect of a virtuous cycle where consumers create a demand for food products sourced in a more animal welfare friendly manner which is transmitted through the supply chain back to the primary producer, who may be able to receive a premium price for their product and thus recoup a portion of any associated higher production costs.

Turning welfare principles into practice: approach followed in Welfare Quality[®]

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Defining principles and identifying criteria are a vital step in an overall monitoring system. But somewhere between the ideals and ambitions comes the reality of putting it into practice. This paper reviews the process from principles to practice and shows how the Welfare Quality[®] team has integrated the natural sciences and the social sciences. It also gives examples of how consensus has been reached regarding the monitoring systems being investigated in this project. The lists of measures included in the full monitoring systems, i.e. those that are currently being investigated on farms, are presented in the appendices to this conference proceeding and on posters at the meeting. Following the experiences of these farm visits and the analysis of the data gathered from each farm, a final monitoring system for each species will be presented. This final monitoring system will be considerably shorter than the full systems presented here, but it is not possible to say yet which measures will be removed.

The science of animal welfare assessment

Animal-based measures have the advantage over resource-based measures, nevertheless there is a paucity of validated animal-based measures. This has been addressed in several ways by scientists in this project. For example, we started from the assumption that we do not need to validate measures reflecting pain in animals, so the focus has been on selecting the most appropriate. On the other hand, while we may agree that fear is negative for welfare there are no well documented measures for several of our species and so studies have been carried out to validate potential measures. Since welfare can range from bad to good, we have also tried to include indicators of positive welfare, but here attempts to validate measures were less successful than those to identify indicators of negative emotional states. Thus it is clear that there are several areas where more research is needed, so that measures in these areas can be included in future versions of the monitoring systems. Another important criterion before a measure can be included in a monitoring system, even if it is a valid measure, is that it should be possible to record it on farm or at slaughter in a reliable way. We found rather few studies of repeatability of measures, between and within observers and so a large part of putting welfare principles into practice has involved confirming that if a measure is included, it will be recorded similarly irrespective of who visits the farm, or when. Last but not least, even valid measures that can be recorded reliably on farm are of no use to the monitoring system if they can not be recorded within a realistic time frame.

The science of assessing acceptability in practice

Social scientists studied farmers' attitudes and behaviour towards animal welfare in three sectors: pig, cattle and poultry. In the same study farmers were asked to give their opinion about animal welfare legislation and its regulation through quality assurance schemes. We compared farmers' attitude and behaviour across species (pigs, poultry and cattle), participation in assurance schemes and across countries.

While doing so we also discussed with farmers how they themselves defined animal welfare and assessed the welfare of their animals. As the Welfare Quality[®] monitoring-scheme was still in the making, it was not possible to have the system itself evaluated by farmers.

This will be done in the on- farm implementation study that will start in a short while. But the former study gives insight into farmers' perception of animal welfare and the need to have it monitored and improved which allows us to formulate sound hypotheses about the acceptability of the monitoring-scheme among farmers, and more specifically its logic of animal-based monitoring and definition of animal welfare, the practical implementation of on-farm monitoring and the socio-economic impact of the assessment scores. In the following on-farm implementation study is necessary to verify these hypotheses but also to specify more in detail under which conditions the acceptability of the monitoring-scheme might be improved.

The logic of animal-based monitoring of animal welfare

Farmers' definition of animal welfare is twofold – first of all animal health and secondly animal behaviour. They accept the 12 subcriteria of animal welfare included in the monitoring-scheme but generally attach most importance to the health – and production related criteria (good feeding, good housing and health). There is also a clear distinction between farmers – those farmers participating in specific animal welfare or organic schemes are most open to criteria that deal with appropriate behaviour and human animal relation.

Most farmers assess the welfare of their animal on the animal itself such as the shininess of their eyes, smoothness of fur- and on their behaviour, such as appetite, calmness, playfulness. This is very similar to many criteria included in the assessment schemes. An important difference is that farmers take many different aspects into account in one instant and compare them to earlier experiences. They know their animals or their stock and see immediately and “with one glance of the eye” if there is something to worry about or not. Still, it may generally be expected that the logic of an animal-based monitoring fits well into farmers' approach to animal welfare as it is similar to how farmers assess their animals' welfare themselves.

On farm implementation

Farmers will, however, have concerns about the implementation of the monitoring tool and about its fitness into farm practice and the farm as a business and not a place for scientific research or experiments. Their concerns will first of all regard the organization of on-farm monitoring and its impact on the production process. Animals might be disturbed with potentially negative effects on growth and production. Secondly the accompanying increase in work load and paperwork will be met with suspicion as well as the potential costs involved. In this regard it is also important how often and when the control is taking place. Thirdly farmers might worry about the attitude and expertise of the person who is monitoring and assessing the welfare of animals. Do they know how to handle animals carefully, do they have farming experience and understand the practicalities of farming?

The definition of animal welfare

Another important area of concern is probably the construction of the scheme itself: the range of parameters, their weighing and calculation of an overall score. Many farmers have the idea that animal welfare is misinterpreted especially by consumers and politicians. They also feel that their professional knowledge of and engagement with animal and animal welfare is undervalued and not sufficiently taken into account. The acceptability of the monitoring-scheme will, hence, also depend on to what extent farmers recognize the definition of animal welfare reflected in the monitoring-scheme.

As far as good feeding, good housing and health are concerned, farmers will probably agree with the parameters and their weight.

The domain of appropriate behaviour including human animal relationship will probably raise more question and debate especially among the average farmers, not involved in specific animal welfare schemes.

The socio-economic impact of assessment-scores

Last but not least, farmers will worry about significance of the score in terms of sanctions, market access and regulation. Farmers might fear that what is now only differentiating between levels will become legally enforceable in the future. And they might worry about the lost profit of investments when a farmer with a new housing system may score lower than a farmer with an old-fashioned system. The potential economic advantage resulting from a high score will ease farmers fear and make the monitoring tool attractive also as a marketing device. Finally, the relevance of the monitoring results in terms of management information will matter importantly for farmers' interest in an acceptance of the monitoring system.

Examples of balancing validity and farmer concerns

Below are two examples of the types of judgments that have been taken in the process towards a monitoring system that is both science-based and acceptable to farmers.

Clinical scoring of pigs

This first is an example of where experts have reached consensus. While the scientific literature revealed many different methods for assessing clinical scoring in pigs, ranging from simple counts of skin damage to detailed topographical and qualitative severity scales, relatively few of these studies have investigated inter- and intra-observer reliability. In discussions between experts in this area, it was decided to use a very simple scoring system and one that could be easily recognised by farmers. The protocol considers four different parameters, both on-farm and at the abattoir: 1. Wounds on the body (sows, weaners and finishers) 2. Tail biting (weaners and finishers) 3. Vulval lesions (sows) 4. body condition (sows). For all parameters, a 0-2 severity scale was agreed upon, where a score of zero would be indicative of good welfare, a score of 1 would indicate some compromise of welfare, and a score of two would be indicative of a serious and unacceptable welfare problem. A training manual for prospective farm assessors has been developed, giving detailed instructions on how each parameter should be assessed and collaborators have compiled a photographic library for ease of training off-farm.

Recording plumage conditions in hens

The second is a more complex example to show how a compromise has been reached on the costs and benefits of a particular methodology. Laying hens have feathers and so to examine a hen properly it is necessary to pick it up. But catching hens may cause panic and in the worse case that could affect production afterwards. Farmers are rightly concerned about this. On the other hand, if hens are caught then it is possible to examine several welfare problems at the same time e.g. plumage condition, foot health and keel bone condition (broken bones), all of which are animal-based, valid measures of welfare. Much of this information is not available if birds are examined from a distance. This problem is more easily solved in broilers since there the alternative is to record these things at the slaughter house, but laying hens will not be followed to slaughter in the Welfare Quality[®] project. We have decided to maximise that data collected but to reduce risk by visiting at the end of laying cycle.

This decision was taken even if ideally the best time to collect this information would be around peak production. Another decision that has been taken is to get, at least initially, the farmer to help collect birds. In this way the farmer can demonstrate the way of catching that works best for his/her hens.

A further benefit in this type of involvement is that the farmer can experience first hand the scoring system and maybe even use it again in the future. Getting the farmer involved, as in this example, also increases the transparency of the assessment process.

Concluding comments

The Welfare Quality[®] monitoring systems are not the 'finished article' but they are a real step forward in a science based approach to monitoring welfare in practice on farm, during transport and at slaughter. As knowledge in this area increases then there will always be a need to update the systems and incorporate new measures and/or replace others. Its logic should be acceptable to farmers as farmers assess the welfare of their animals in a similar way. But a farm is not a place for scientific research; it is a business and farmers realize that monitoring and assessing will have economic effects in the short and the longer run. In order to increase the acceptability of the monitoring-system among farmers, it is important to take their concerns into account. This means taking care of the practicality of on-farm monitoring and involving farmers in the monitoring-process. Of utmost importance is finally that the assessment results are fed back to farmers in a way that they are informative and relevant for the management of this particular farm. Good animal welfare is, after all, a shared interest of farmers and scientists.

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Practical strategies to improve on-farm animal welfare

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Although animal welfare can be defined in various ways, all animal welfare scientists agree that fear, pain and frustration are major welfare problems. One of the objectives of this paper is to illustrate how the research that is being carried out in Sub-project 3 will lead to practical strategies to reduce these welfare insults in farm animals and, thereby improve their quality of life.

In ideal condition, fear is a normal and adaptive reaction to stimuli that are perceived as a threat by the animal. However, regardless of its adaptive nature, fear can lead to suffering, injury or even death, particularly when very intense, frequent or long-lasting. The fear response includes behavioural and physiological changes and some of these have detrimental effects on productivity and product quality. Therefore, fear may not only damage welfare, but it can also cause serious economic loss.

When exposed to a frightening stimulus, the intensity of the fear response of a given animal will depend not only on the nature of the stimulus but also on the animal's genetic make-up and its previous experience with the stimulus. Indeed, if two individuals of the same species are exposed to the same stimulus, the intensities of the induced fear state and their responses are likely to be very different. Since fearfulness, (the likelihood of being easily frightened) is governed to a considerable degree by the genotype selective breeding may offer solutions through the selection of individuals that are less likely to show excessive fear. Fearfulness is one of several traits that affect an animal's ability to cope with psychological, physiological and immunological challenges, and it is relatively easy to measure. Work currently in progress in WP 3.2 is aimed at understanding the genetic basis of fearfulness and other psychobiological traits in dairy cattle with the final objective of suggesting practical selection programmes to obtain animals that are better able to cope with environmental challenge. The ethical implications of genetic selection for reduced fearfulness, or generally for selection for behaviour, will also be addressed.

Notwithstanding the importance of genetics, it is clear that fear may also be reduced by controlling the stimuli that are likely to elicit it. Most –if not all- farm animals may perceive humans as potential predators and, therefore, fear of humans can be a major welfare problem in livestock production. Research carried out mainly in Australia has shown that the behaviour and attitude of the stockperson has a major influence on the welfare and productivity of farm animals and that these effects are mediated by whether or not the animals show fear of humans.

Encouragingly, through appropriate training and education the quality of stockmanship –and consequently the level of welfare- can be significantly improved.

This underpins the collaborative efforts between Australian and European scientists in WP 3.1 to develop training programmes so that the general principles developed in Australia are tailored to the specific characteristics and cultural backgrounds of European farming systems and stockpeople respectively. Since such characteristics are very likely to differ across Europe, this is a clear example of the need for international collaboration. Our work in WP 3.1 will lead to a web-based training programme for stockpeople working with poultry, cattle and pigs.

Humans are not the only stimuli that can frighten farm animals. In fact, aggressive interactions with other animals of the same species may also cause fear and injury, and aggression may also be a result of fear. Aggression often results from the animals' need to compete for resources, such as access to food, water or resting places. In addition, unpleasant emotional experiences such as hunger, pain or frustration are likely to increase the aggressiveness of animals. Consequently, improvements in housing and husbandry that reduce the need to compete for resources or the occurrence of emotional distress could reduce aggression and thereby improve welfare. Work in WP 3.6 will provide practical guidelines for achieving these objectives. Encouragingly, research aimed at establishing the minimum feeder space required to avoid aggression in beef cattle have already shown that reduced competition for food improved both welfare and product quality. More specifically, the incidence of liver abscesses was lower in animals from the "low-competition" rather than the "high-competition" group. We are also testing the common assumption that mixing multiparous and primiparous dairy cows damages the latter's welfare because of their inability to successfully compete for resources with the multiparous cows. The interrelationship between the amount and quality of fibre in the food, the feeding system and aggressive behaviour in group-housed pregnant sows are also being established in WP 3.6. Work is also underway to determine the genetic basis of aggressive behaviour in pigs.

Lameness is considered a major welfare and economic problem in farm animals because it is one of the main causes of pain, it interferes with the expression of normal behaviour and it reduces productivity and life expectancy.. Work in WP 3.4 addresses lameness in dairy cows and broiler chickens. In dairy cows, lameness can reflect the interplay between genetics, nutrition, housing and husbandry, with the type of flooring having a major impact. Our research in WP 3.4 will identify the best types of flooring and determine how trimming practices interact with flooring to modify the incidence of lameness.

The very high growth rate of modern genetic strains and their low levels of activity contribute to the commonly seen development of lameness in broilers. Sequential feeding of two diets with different amino acid content on consecutive days is being explored in WP 3.4 as a strategy to reduce lameness. The results obtained so far are very promising, particularly since lameness can be alleviated without reducing production levels.

As is the case with many other welfare-related traits, lameness is sensitive to the animals' genetic make-up as well as their environment.. Work in WP 3.2 is unravelling the genetic basis of leg problems in pigs with the primary objective of designing a selection programme to reduce lameness.

Pain may also result from other harmful behaviours shown by other animals, such as tail-biting in pigs and feather and vent-pecking in laying hens. These damaging behaviours are studied in WP 3.3.

Apart from potentially causing injury, pain and distress in the victims as well as economic losses these behaviours often indicate that the environment in which the animals are kept is inadequate. Previous research showed that tail-biting in pigs was much reduced if the animals were kept on straw or even just given small amounts of it. Current work in WP 3.3 is determining if there is a 'sensitive' period in the life of pigs when access to straw has long-lasting effects on their propensity to show tail-biting later on in life. In order to better achieve this objective an innovative behavioural test of the propensity to develop tail-biting has been designed and tested (Statham, 2006). This could potentially serve as a selection criterion in future breeding programmes.

Feather- and vent- pecking in laying hens are multifactorial problems and scientists working in WP 3.3 are developing a risk model to help producers identify those factors that are likely to exacerbate these problems on their farms. In addition, work is in progress to improve our understanding of the genetic basis of feather pecking.

Neonatal mortality is a major welfare problem in pigs, affecting large numbers of animals –as an average, more than 1 in 10 piglets do not survive to weaning-. Another task in WP 3.5 aims to illuminate the genetic basis of differences in piglet viability in different housing conditions, and to develop a decision support tool to increase piglet survival on farm (Baxter 2006a; 2006b; 2007).

Most animal-based measurements currently used to assess welfare in farm animals are indicators of negative emotional states. Most scientists agree that there is a need to develop positive indicators, though they are aware of the difficulties involved. Play behaviour might be one such positive indicators, as animals tend to decrease play when in pain or distress. Work in WP 3.6 is studying selected environmental conditions that may increase play behaviour in calves and piglets. It is expected that a better understanding of such conditions will help producers provide environments that offer the animals greater opportunities to perform behaviours that are indicative of good welfare.

Acknowledgments

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Construction of product information from animal welfare assessment

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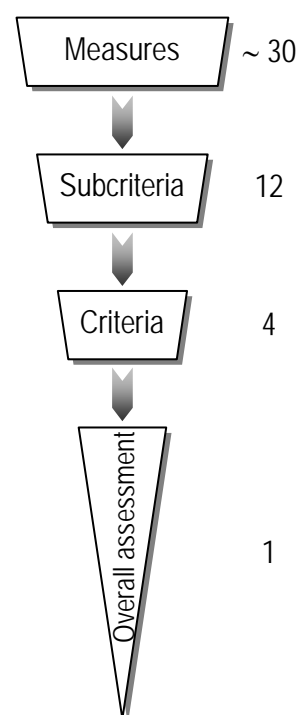
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Welfare Quality[®] aims at proposing a standardised assessment of cattle, pigs and poultry welfare on farm and during transport and slaughter that allows gradual results.

Several systems have been proposed in literature for the overall assessment of animal welfare at farm level for the purpose of advising farmers or assisting public decision-making. They are generally based on several measures compounded into a single evaluation, using different rules to assemble the information. For instance, data obtained on a farm can be (i) analysed by an expert who draws an overall conclusion (e.g. Algers *et al.*, 1995), (ii) compared with minimal requirements set for each measure (e.g. Main *et al.*, 2001), (iii) converted into ranks which are then summed (Whay *et al.*, 2003), or (iv) converted into values or scores compounded in a weighted sum (e.g. TGI35L: Bartussek, 1999) or using *ad hoc* rules (Capdeville and Veissier, 2001). However, existing methods used at present (at least when used exclusively) may be insufficiently sensitive or not routinely applicable or allow too much compensation between welfare aspects..

In Welfare Quality[®], a model for overall assessment is elaborated, thanks to methodologies used in Multicriteria Decision Aiding. A set of 4 welfare criteria and 12 subcriteria has been defined (see Veissier *et al.*, in this volume). Each subcriterion is checked with a series of related measures (see Keeling and Bock, in this volume). Therefore, the measures need first to be integrated in subcriteria, then criteria and finally overall assessment (Figure 1). This hierarchical procedure is described below.

Figure 1.
Hierarchical structure



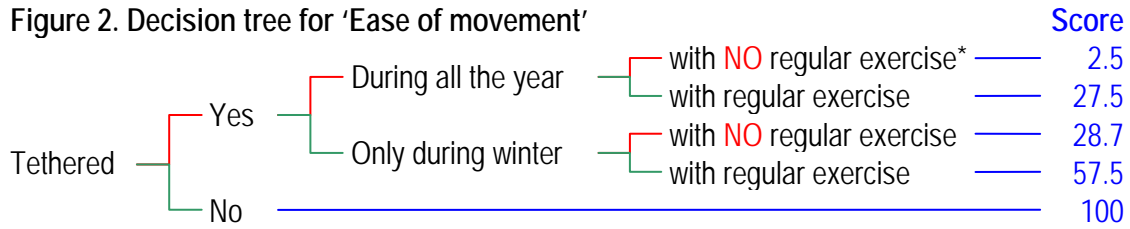
Construction of the 12 subcriteria from the measures

The results obtained on the measures related to a given subcriterion need to be interpreted and combined to produce a score for that subcriterion. We choose to express these scores on a 0-100 scale with 0, very poor welfare and 100, very high welfare. For each subcriterion the most appropriate calculation is chosen according to the number of measures to be combined, their precision and their relative importance.

The calculations are parameterised according to expert opinion from Welfare Quality[®] researchers involved in the development of measures (at least four experts are consulted).

Two examples of subcriterion construction are presented below, one for 'Ease of movement' and one for 'Absence of injuries' in dairy cows on farm.

For 'Ease of movement', five alternatives are defined according to the possibility for exercise offered to cows. Experts are asked to attribute a score to each alternative displayed on a decision tree (Figure 2). The subcriterion score attributed to each alternative corresponds to scores averaged across experts.



* 'regular exercise' = from twice a week to daily outdoor runs (which last at least 1h)

For 'Absence of injuries', three categories of cows are considered: 0- cows free from injuries, 1- cows with hair losses, but no severe injury, 2- cows suffering from one or several severe injury (i.e. lesion or swelling). The subcriterion score is derived from a linear combination of the proportions of cows in each category (respectively p_0 , p_1 and p_2):

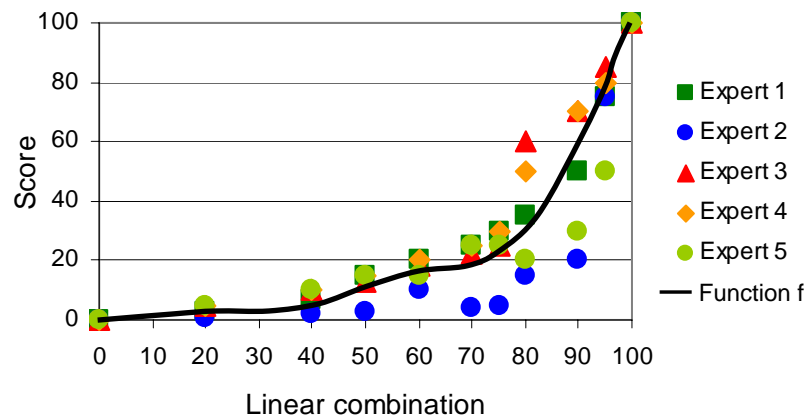
$$\text{Score} = f \left(100 - \frac{\sum_{i=0}^2 w_i p_i}{w_i} \right) \text{ with } w_i \text{ the weight assigned to the category } i.$$

Eleven arrangements of p_0 , p_1 and p_2 are submitted to experts who are asked to rank them from best to worst and then to attribute a score to each arrangement.

We estimate the weights w_i so as to reflect the ranks given by experts. In that case, we obtain: $w_0=0$, $w_1=1$ and $w_2=5$.

Because expert opinions do not follow a linear increase, we define a non-linear function f (based on *cubic B-splines* (Bartels *et al.*, 1987) that allows us to best fit with expert evaluations (by minimising the squared error between calculated scores and those given by experts) (Figure 3).

Figure 3.
Experts' opinion on
arrangements of
proportion of cows
affected by no injury,
mild injuries, severe
injuries



Construction of the 4 criteria from the 12 subcriteria

Scores obtained for the 12 subcriteria are combined to form scores for the 4 criteria. At this stage, we notice that experts attribute more importance to some subcriteria and generally do not accept full compensation (i.e. a good score on one subcriterion does not fully compensate for a bad one on another subcriterion). To follow these two properties, we use *Choquet Integrals* (Grabisch and Roubens, 2000). Compensations are limited by attributing more importance to lower subcriterion-scores. This should encourage producers to improve first the most problematic elements.

The parameters of the integrals are again derived from expert opinion on arrangements of subcriterion-scores (e.g. if 'absence of hunger' is scored 40 and 'absence of thirst' is scored 60, what score would you attribute to the criterion 'good feeding').

Aggregation of the 4 criteria into an overall assessment

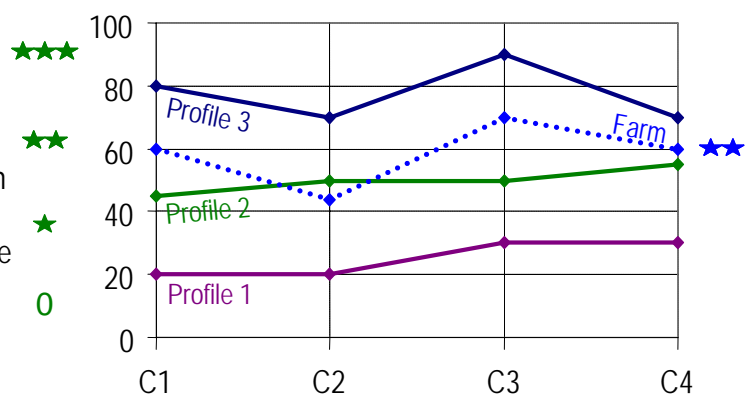
Animal welfare is generally considered as a concept made of several independent dimensions, implying that welfare criteria cannot be compensated for by each other. Hence, we plan to aggregate welfare criteria into an overall assessment by comparing farms or slaughter plants to reference profiles that delimit welfare classes (e.g. from zero to three stars) (Figure 4).

Scientists and stakeholders (representatives of producers, consumers, animal protectors, and institutions) will be consulted to set the reference profiles and to define rules of membership of the 4 four welfare classes.

Conclusion

The model for overall assessment of animal welfare described in this paper formalises the reasoning followed by scientists (in animal science or social science) and potential users (from producers to consumers). Thanks to the proposed construction we try to get closer from the points of views both of animals and societal groups. By avoiding black boxes, the hierarchical construction produces intermediate scores (at criteria and subcriteria level) that can be used to advise producers, hauliers and slaughter plants, and help them improve the welfare of the animals they are in charge of. The proposed construction remains flexible: parameters may vary according to future societal concerns and new scientific knowledge on animal welfare measurement, allowing continuous improvements.

Figure 4. Example of criteria aggregation by comparison to reference profiles (not in Welfare Quality[®]). Although the farm shown by dotted lines is not better than Profile 2 on Criterion 2, it may still be classified as a 2 star farm because the gap with Profile 2 is not large.



Acknowledgments

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Exploration of strategies to implement welfare schemes

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How can a welfare standard, a monitoring scheme and an information system be utilised in practice? Based on what these schemes can provide and knowledge about already existing systems, this paper explores some venues or strategies for implementing outputs from Welfare Quality[®], recognising their respective conditions and benefits. Unified methods for farm animal welfare assessment, applicable across Europe, could be used to;

- Allow inter state, and inter country, comparisons for marketing purposes
- Promote and support generalised improvements in animal welfare across Europe
- Improve research
- Inform legislative developments

The first two points address market based initiatives, involving certification schemes, product information programmes, and a benchmarking system for farmers. We will start by discussing these, one at a time.

Voluntary certification schemes

There has been a large increase in voluntary certification schemes in many countries. Membership is not a legal requirement and is often associated with a marketing claim. Where these schemes are a precondition for the sale of products to retailers, this voluntary system can sometimes effectively become mandatory for the farmers. Certification schemes often include a basic requirement to comply with relevant welfare legislation but there are often additional welfare standards that have to be assessed in a similar fashion. There is a perceived need amongst some certification schemes to use more animal-based measures for the certification process, and *FAWC (farm Animal Welfare Council) recommends that scheme owners should work towards refining their standards and inspection procedures (tools) to achieve an **increasing inclusion of welfare outcomes**, so as to provide both a better reflection of the welfare of the animals within a production system and the level of stockmanship on the farm.*

For this to be effective, standardised welfare assessment methods would be of real value. Any system proposed would need to be sufficiently transparent for the controlling agency to defend an assessment decision. The system would need sufficient guidance for each welfare measure to enable a trained assessor to make consistent assessments and to ensure consistency between assessors.

Product information systems

Market based initiatives may involve differentiating strategies, so that consumers can choose welfare friendly alternatives. Many consumers ask for additional information about food, but the numerous claims about food attributes on labels may have increased consumer confusion and a mistrust of labelling. It may be crucial that information identifying welfare friendly products is, on the one hand, simple and clear, and, on the other hand, well documented and trustworthy.

The Welfare Quality[®] process could inform the consumer through;

- A labelled product (form, style etc of label and information being defined by ongoing work).
- How best to provide the consumer with information via web links, information leaflets, tray liners in fast food restaurants, leaflets and data sheets on the types of system in which animals are reared.
- The potential for Web based information on the 'welfare meaning' of any assessment.

The Welfare Quality[®] project is working on the construction of a prototype label and information system to identify welfare friendly products, and is tasked with creating an outline document describing the route toward a technical product information standard. Teams in Welfare Quality[®] are addressing issues regarding labelling and information which include the level of 'detail' requested by consumers regarding animal welfare. The preferred format for information transfer - such as information on the product, in the shop, via mass media, the internet, etc. is being addressed. The potential content of the information - which welfare issues are of interest? should welfare issues stand alone or be bundled together with other issues – like 'organics' or 'local food' or nutritional information? are also being addressed.

As well as the content of the information which could be provided – practical problems are being explored, including - the size, space & time taken to read any material, the impact of the use of images, and the potential for misleading messages. The organisation of the information system is also being examined – who may wish to use the label and information? what will be their expectations for transparency? and how easy will it be to audit the use of symbols and marks? At another level, the Welfare Quality[®] teams are exploring the links that label and information will have to existing certification and monitoring systems and the related links to public, private and NGO interests.

To provide advice and support for farmers

Welfare assessment can be used in a supportive framework where farmers use assessment to monitor welfare over time, and receive advice and support to address observed welfare issues. Some systems used for other legislation or certification purposes may also be used as an advisory / management tool, e.g. farmers and advisors may wish to use assessment to identify areas of potential improvement in welfare. Welfare assessment results can be reported back to the farmer with a comparison of their performance with farmers using similar systems ("benchmarking"). A benchmarking system that educates farmers on their own performance and encourages them to improve is an appropriate mechanism for ensuring that these benchmarking results lead to husbandry improvements. Many existing farm standards promote the use of a health plan to enable the farmer to make planned improvements in disease, health and welfare – and assessments carried out in a uniform and repeatable way may be of real value in this supportive role for farming.

As a research 'tool'

On-farm welfare assessment could be used as a research tool to assess the welfare impact of specific farming methods e.g., specific building types, husbandry systems and/or animal genotypes. Research has been important for the legislative process in animal welfare and standardized welfare assessment techniques could be used for interpreting such research and creating a 'unified' view.

To allow uniform application of legislation

On-farm welfare assessment could be used to evaluate compliance with national or EU legislation. It is possible that a future welfare quality assessment could be used as a part of the routine monitoring of farming systems to help state inspection systems to prioritise their resources (by directing inspections, and support and advice) to farms which need support, and not to those farms with good welfare standards. Similarly, these methods could be used to help the state to identify farms which are close to the legislative minimum, and hence to direct aid, support and advice to help advance these farms. The potential for uniform welfare assessments to be used in cross compliance (revision of CAP) decisions, and to influence direct payments to farmers in the EU of (cattle and pigs), could be used to ensure that farmers comply with EU directives on animal welfare, and the level of payment may be modified if the farmer demonstrates improved levels of animal welfare (above the legal requirements) assessed by verifiable standards. Systematic monitoring of this kind will be of interest even to a wider audience, including the general public, NGOs, and traders, allowing them an overview of the overall situation and to compare between countries.

What 'shape' are these technical documents likely to take?

As well as defining and testing measures to enable welfare to be assessed, it will be necessary to draft technical documents describing these techniques so that the potential users described above can use them. These specifications are required not only for increasing applicability, but also to produce high reliability. To address the commonly voiced complaint that '*Animal Welfare, its not a level playing field across Europe*' – the technical measures, and the protocols, techniques and methods required for their use, will be drafted into technical documents, which will contain;

- Short paragraphs containing the 'requirement' and informing the farmer and the inspector what will be required.
- The limits & thresholds values for measures.
- The permitted variation due to age, sex, and the type of farming system, and allowing for the season, the time of day when the animals are observed.
- The technical documents will re-state the legal requirements for, for example, medicine use and procedures like castration or tail docking - so that the farmer and the inspector are sure that the farm stays within the legal requirement.

Implementing welfare schemes and product information in contemporary Europe

Above we have outlined some major outputs from Welfare Quality[®] and their potential uses. However, as indicated, numerous initiatives already exist, with rather diverse purposes. In order to increase the applicability and relevance of Welfare Quality[®], it is important to recognise that distribution and governance structures vary considerably across Europe, as do public opinions. Importantly, the distribution of responsibility for animal welfare and the power and resources to take initiative are highly diverse. Welfare Quality[®] can not develop one strategy for each of these situations, but must instead combine standardization with flexibility of implementation in ways that make the systems relevant for different actors (like retailers, processors, primary producers, authorities, NGOs) in different situations (starting from scratch or building on already existing systems).

European market initiatives addressing animal welfare are very complex. Several venues can be identified in which the Welfare Quality[®] contributions may have varying relevance; animal welfare as part of a branding strategy by a retailer or processor, a retailer segmenting strategy, a specific production scheme (like organics), and as an element of a quality label.

So far, special animal welfare schemes combined with a product label are rare, more common being either schemes that are not linked to product labels or labelling programmes where animal welfare forms one among a large range of elements (taste, provenance, organics, etc.).

We have seen that while many wish for consumers to make a larger effort in improving animal welfare, conditions are far from optimal in terms of supporting consumer involvement. Sufficient availability of information is necessary. But making people willing to spend more requires that they see the need to become involved (i.e. recognising that there are problems where their action is needed) and that these extra consumer efforts pay off in terms of better welfare. The consumer must also be confident that the systems established to provide this information are trustworthy. To create trustworthy systems the ability to demonstrate high standards and good scientific quality is not enough. The certification schemes and product information must be audited by an independent third party and transparency must be ensured. Here, it is important to notice that such processes involve much more than market supply and shopping, but collective mobilisation and public debate as a credible reputation is difficult to build and easy to lose.

The focus on market initiatives does not mean that the state is irrelevant. We have already indicated how the Welfare Quality[®] monitoring programme could be used to make inspections more systematic and efficient. In some countries, minimum requirements by law are set at a high level. But in most situations, there is considerable space for improvement, beyond those minimum levels. At the same time, the minimum requirements do help to create a level playing field for traders.

We may be able to see that the various measures to be developed in Welfare Quality[®] could work together to produce applicability and relevance, while at the same time building reliability and trustworthiness. Recognising the diversity of starting points and contexts, however, means that the ways in which these measures are combined and applied must also allow for considerable flexibility.

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Animal welfare and certification schemes: the view of animal protectors

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Consumers and citizens are increasingly concerned about the way their food is produced and in particular about the way farm animals are reared, transported and slaughtered. A Eurobarometer survey in 2005¹ confirmed that in all the (25) Member States that were surveyed, consumers are concerned and ready to pay more for high-welfare products.

As consumers' willingness to pay for high welfare products is not fully reflected in sales figures, Eurogroup for Animals believes the market for high animal welfare products to be underdeveloped. The potential gains that it holds for the EU food industry and citizens are numerous, however;

- it allows the EU to trade on its comparative advantage in high quality production,
- it is what the consumers and citizens expect,
- it is a unique and important mechanism for supporting the production of robust, less stressed, healthier animals,
- it provides a means of delivering other objectives of the EU, including sustainable development, safe food and a competitive economy.

The ability to realise these gains through the market will depend on how well consumers' concerns can be translated into purchases. The same Eurobarometer (ibid) painted a compelling picture of consumers' looking for high welfare products on the supermarket shelf, but not actually making the purchase because they were unable to identify them.

Certification schemes have proven themselves to be effective tools in connecting consumers with high welfare products. Poorly managed however, they can perversely confuse the consumer further. This presentation therefore addresses the question of how certification schemes can best be managed to strengthen the market.

The presentation also argues that such schemes are necessary, but that they should not be considered an alternative to other means of protecting animals, such as legal standards and support through the CAP.

The Role of Certification

Eurogroup believes that certification can never replace legal standards as a means of protecting animals, as in practice the two mechanisms perform different functions.

Some farm animals do enjoy a level of protection under EU law. The level of protection that they are provided, however, is basic, serving only to protect the animals from the worst abuses. All EU legislative proposals are preceded by a scientific analysis of the pertinent welfare concerns. In recent years they have been produced by the European Food Safety Authority, EFSA. In every instance, comparison reveals a large gap between the level of protection indicated by the scientific opinion and that prescribed by the legislation itself. Though basic, legal standards do have the advantage, however, that they potentially extend their cover to all production systems. Their role is therefore, in practice, one of *"basic protection for all"*.

Voluntary schemes, by contrast, are limited in the number of animals they can protect by the size of their market. Where the market is there however, they can provide extremely high standards of welfare. Their role is therefore, in practice, one of *"high protection for some"*

When we put these differing roles in the context of the potential gains detailed above, three implications become evident;

- 1) The animal welfare standards that are certified should be significantly higher than those found in basic legal standards. This is partly because consumers have the right to expect that the products they buy already conform with the law - further certification of this therefore being redundant. But furthermore, as we see above, the role of the certified schemes is to provide higher welfare products to those consumers who will buy them.
- 2) It is desirable to certify to more than one level of welfare. If certification is a tool to communicate high welfare standards to the consumer, there is no incentive for producers to go higher than the certification demands. If the certification does not allow the consumer to differentiate between two products on the grounds of welfare, they will buy the cheaper. Certification which does not allow the highest standards of welfare to be recognised will therefore only serve to 'dumb-down' the market, to the detriment of animal protection.
- 3) Legal standards of animal welfare sometimes are sometimes seen negatively, due to concerns that they force producers to increase the costs of production, and therefore represent a net loss to the enterprise. Voluntary standards, however, operate in a different way. The producer is not forced to increase expenditure, and will only do so in the expectation of financial gain. Cost conscious producers may therefore resist an increase in legal standards for animal welfare, but welcome higher voluntary standards, particularly if the certification schemes prove effective in increasing the market for their products.

Effective Schemes

In the UK, Freedom Food, an animal welfare based assurance scheme with 2,000 farmers and standards in 8 different sectors, is a good example of how high animal welfare can deliver welfare and business benefits with an ever growing membership and increase in sales. In the case of broilers the sales have increased from 6.5 million in 2004 to 17 million in 2006.

However there is already a wide range of voluntary schemes on the market and in the absence of an EU legal framework with baseline criteria for these schemes, there is a potential to confuse and mislead the consumers. Some schemes do not make their standards public, other standards are the same as the minimum legal standards or have little or no independent control mechanism.

Again, consumers who cannot differentiate the product on quality will differentiate on price. This gravitation of the market towards lowest quality is often referred to as the *market for lemons*², a term drawn from the notorious second-hand car market where consumers are poorly placed to judge quality.

For this reason Eurogroup calls on the Commission to establish a legal framework for all food quality or assurance schemes which take account of the following framework.

Framework for quality schemes

The ability of a scheme to deliver high animal welfare is dependent on the rigour of its procedures. Six issues which Eurogroup believes are imperative to the operation of an assurance scheme should be considered:

- establishment of standards
- transparency
- auditing
- labelling
- traceability
- sanctions

1. Establishment of standards

1.1 *Setting the standards*

The establishment of standards should be based on science and should be auditable.

1.2 *Reviewing the standards*

Standards should be regularly and independently reviewed (at least once a year). The process should include representatives from other stakeholder groups such as consumers.

1.3 *Coverage of the standards*

Standards should cover all stages from birth to death of the animal.

If the scheme is aimed at a specific area such as animal welfare, it is essential that it also provides standards in other areas that are consistent with legislation, in particular compliance with food safety standards and risk assessments on biosecurity arrangements.

1.4 *Level set by the standards*

It is not the role of this paper to prescribe detailed standards, as examples can be found in many assurance schemes. Any assurance scheme that is delivering high welfare should be constantly monitoring its standards and raising them, for instance in reaction to changes in the legislative baseline standards or in new technological advances.

Eurogroup believes that quality schemes must set standards that are well above baseline legal standards or conventional farming standards.

1.5 *Communication of the standards*

The standards should be formed and presented in clear, unambiguous language.

2. Transparency

The scheme should be as transparent as possible. In particular all standards should be openly available and accessible and information on the operation of the scheme and its assessment also made available.

3. Auditing

3.1 *Independence*

The independence of the audit is crucial. The certifying body should be independent of the standard setting body and accredited to the European standard on farm assurance, EN 45011.

3.2 Timing

An audit of the scheme should be completed on an annual basis and be on a set proportion of the operators to ensure effectiveness of the inspection system.

3.3 Qualifications and training

All personnel auditing a scheme should be experienced and qualified in auditing. It is recommended that this is linked to a quality assurance qualification or a formal auditing qualification. The personnel should also have experience in the livestock sector being audited. A training programme should be established to ensure that there is harmonisation of standards being applied. Auditors should be members of International Register of Certified Auditors.

3.4 Second layer of assessment

An additional level of assessment to the audit needs to be established to ensure that the audit system is operating to its specifications. Spot checks should be done on the auditing system and the consistency of auditing.

4. Labelling

4.1 Transparency of labelling

Labelling should be clear and honest and reflect the level of the standards.

4.2 Consistency with legislative standards

Where marketing of other standards exist, (eg Regulations on the marketing and labelling of eggs, or the requirements for organic schemes) the labelling should be consistent with the standards laid down under these rules.

5. Traceability

5.1 Process

A process of traceability should be established that would include each stage of the supply chain (eg retailers, processors, packers, producers) and provide sufficient disaggregation of the products to ensure complete traceability of any product under the assurance scheme.

5.2 Checks

It is recommended that periodic spot checks occur on products from the shelf to ensure that the traceability process is operating to the standards laid down in the scheme.

6. Sanctions

A system of sanctions should be available and applied for non-compliance with the scheme. This system should establish the different levels of sanctions and the time periods to ensure that rectifying action is completed by the producer to comply with the standards. It is recommended that one of the sanctions for the most serious offences and repetition of offences is suspension from the scheme.

Existing assurance schemes. Freedom Food has detailed animal welfare standards on 8 species. Assurance schemes delivering high welfare standards are found in Sweden (the Krav scheme), and Germany (Blue Angel scheme). Eurogroup for Animals has proposed specific welfare standards in four sectors to act as baseline for qualification to financial assistance, for producers under the WTO's Green box.

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Retailers dealing with welfare schemes

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In order to improve farm animal welfare by the use of market forces rather than legislative obligations, cooperation of retailers is generally considered to be a decisive factor. By composing the assortment, retailers determine which alternatives consumers can consider in their consumption decisions. In particular, supermarkets have a strong influence on consumer decision-making and thus are a strong factor in generating demand for welfare products.

This contribution builds on research in the context of national and international research projects on animal welfare in the market (Ingenbleek et al. 2004), to describe how retailers deal with welfare schemes. First, a brief background on retailers is provided, followed by a short description of the major trends in retailing. These sections explain why retailers are sometimes less cooperative than hoped for by other stakeholders. Next, it is discussed how retailers may benefit from welfare schemes. In order to involve retailers in these schemes, it is important to understand which arguments for welfare schemes “fit” the retailer’s strategy. Finally, a typology of the schemes is presented, followed by some implications for Welfare Quality[®].

What is a retailer?

A retailer is a company that sells products and services to consumers for personal or family use. The activities of retailers can be divided in providing an assortment of products and services, bulk breaking, stock keeping and providing service. Importantly, we should not only think of “traditional” food retailers as large supermarkets, but also as specialty stores (of which organic food shops are specific type) and street trading. Of these retail types, supermarkets are by far the most dominant players and their market share is still increasing as compared to the other traditional retailers. Next to these traditional retail outlets, “out-of-home” retailers are an innovative and growing segment, including restaurants, caterers, and other outlets such as shops at gasoline stations. This broad conception of retailers is important because different retailers may be faced with different challenges on their market and thus have different preferences regarding welfare schemes.

Trends in retailing

The retail market is affected by several structural developments. The following are particularly relevant for welfare schemes:

Increasing price sensitivity. Consumer price elasticity has doubled between 1956 and 1999. In other words: the price drop that is necessary to make consumers switch between alternatives is now smaller than it was in the past. Price increases for meat, dairy products and eggs, due to welfare costs, should therefore be part of a cogent price strategy.

Concentration. Several developments such as globalization, removal of trading barriers and increased competition, increased concentration among retailers. The four largest buying desks of retailers in the Netherlands have for example a joint market share of 85%.

Growth of store size. Over the past decades, supermarkets have become larger, including their assortments of meat, dairy, and eggs. Overall, assortments range from approximately 5,500 different products in convenience stores to about 17,000 in full service supermarkets, to even 30,000 in hyper stores. As a result, consumers are confronted with larger varieties of products to choose from. This, however, doesn't mean that retail space is easily available. In fact, product innovations should prove themselves faster than ever to get a permanent foothold in the shelves of retailers.

Declining sales in traditional stores. Overall, super markets gain market share at the expense of traditional quality stores such as butchers. This doesn't mean that these specialized outlets will eventually decline. Instead, they are focussing more on specific market positions such as quality and regional focussed images that consumers value at specific moments rather than for their weekly grocery shoppings (e.g. weekend shoppers, tourists).

Store brands competing with A-brands. Within supermarkets, traditional A-brands suffer from competition by retailers' own store brands. Faced with increasing competition and pricing pressure from price-sensitive consumers, retailers favour their own store brands because they generally have more attractive profit margins. This leads to rapid imitation of successful products by A-brand manufacturers and a growing difficulty of A-brands to differentiate themselves from store brands.

How welfare schemes may help retailers

Retailers may benefit from welfare schemes in several ways. These ways are associated to three generic strategies that retailers may use to achieve a competitive edge: welfare focus, differentiation, and follower. Porter (1980) developed these strategies for business in general. Here, we apply them to retailers in order to understand how they deal with welfare schemes.

Welfare focus. Firms that follow a welfare focus strategy, use animal welfare schemes to attract specific market segments of consumers to their store. These consumers are generally relatively small groups of "early adopters" or forerunners that are sensitive to welfare arguments, and willing to pay relatively more money for these products, and willing to put more effort in obtaining these products (for example by visiting specialty stores for which they need to travel further). These segments need not to be identical across countries. Whereas some countries have niche markets of consumers with a specific preference for animal welfare (e.g. the United Kingdom), others have niche markets in which animal welfare is one out of several characteristics associated with sustainability (think for example of stores that sell uniquely organic products). Although, the market segments that are attracted by these products are generally small, they may be profitable. One of the reasons why supermarkets include welfare and organic products in their assortments is for example to attract these market segments to their store. Subsequently, these consumers are likely to do also their other grocery shoppings in that store.

Welfare differentiation. Firms that follow a welfare differentiation strategy aim to distinguish themselves from competitors on the basis of quality, like taste, service, brand, and presentation. Welfare and other sustainability attributes support the consumer's overall quality perception, and thus help the firm to differentiate it self. Retailers may benefit from including welfare for two reasons. First, superior quality may be a basis for higher willingness to pay (which may help to cover the investments in animal welfare). An example of such a product is for example veal, as major European veal producers have successfully invested in animal welfare in order to increase the overall quality of their product and get access to super markets.

Second, the socially responsible image that is created by the attention to welfare may help retailers in times of crisis. Research has shown, for example, that firms confronted with a safety crisis are more easily “forgiven” by consumers if they have a positive social responsibility image. Animal welfare may contribute to such an image and can thus be helpful if retailers are confronted with food safety incidents or other types of crises, like pressure groups “shaming” brand names and retailers’ images.

Welfare followers compete generically on lowest costs, offering lower prices to consumers than their competitors do (“discount markets”). Because their aim is to be the most efficient competitor in the market, they are unlikely to be forerunners with respect to welfare schemes because these schemes risk the chance of cost increases. This doesn’t mean however that they won’t be concerned with animal welfare at all times. They are likely to follow once all competitors have taken steps (and thus already increased their costs). If low cost firms still not follow once all others have taken steps, they risk the chance of harming their reputation and to become “the only animal-unfriendly retailer” rather than “the retailer that is almost equally good but cheaper”. Typical cost-leaders like Aldi and Lidl, for example, joined the other Dutch supermarkets in deciding to ban the cage eggs from their shelves before the official ban on cage eggs by the EU.

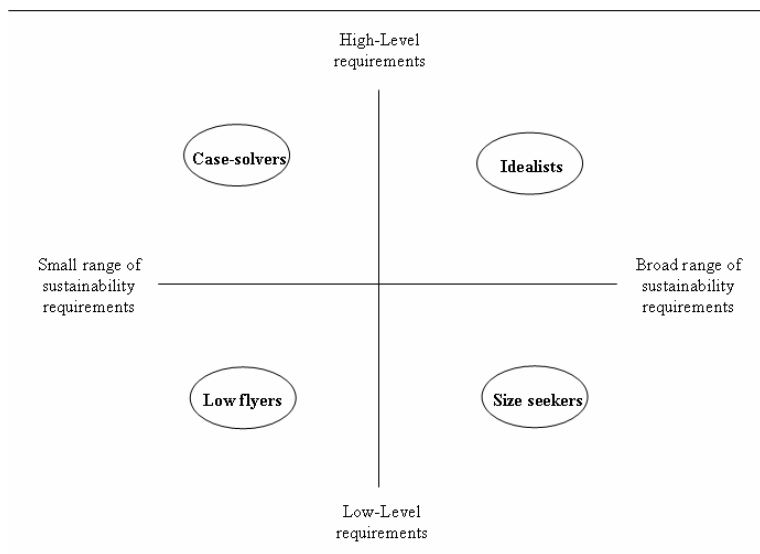
A typology of welfare schemes

Given that they are in a situation of heavy competition, increasing price sensitivity, and that they should manage thousands of products, retailers are often unable to run projects on animal welfare themselves. Instead, they rely on the services of others, i.e. organizations that develop assurance schemes on food safety, freshness, traceability, quality, and/or sustainability, including animal welfare. Such a criteria formulating organization (or “code of conduct organization” as Ingenbleek and Meulenbergh, 2006, p. 453 call it) is defined as “a non-governmental organization that develops one or more formal statements of rules of conduct regarding environmental and/or social domains of sustainability that producers voluntarily agree to implement.” In these organizations, different groups of stakeholders (e.g. farmers, animal interest groups, and retailers) jointly discuss, and negotiate about the welfare criteria. By participating in these criteria-formulating organizations and/or by adopting their standards, retailers enhance their legitimacy towards society. They build on the stakeholder’s reputation, and they can build on the knowledge and other resources of stakeholders to fulfil their societal ambitions. Research within the Welfare Quality[®] program has counted over 100 welfare schemes in different product categories developed by this type of organizations in six Western European countries (Roex and Miele 2005). Retailers may apply these criteria to their supply chains, thus contributing to animal welfare.

Based on the mission that criteria-formulating organizations aim to fulfil, two dimensions can be distinguished: (1) the level of criteria that the criteria-formulating organization sets for actors to comply with, ranging from high to low, and (2) the domain of ethical issues that these criteria cover, ranging from narrow to broad (see Figure 1). These two dimensions lead to a typology of four different types of criteria-formulating organizations. *Case solvers* provide standards aimed at specific issues (e.g. animal welfare, like Freedom Food in the UK) and therefore set high criteria on this issue only. *Idealists* also set high criteria, but do so for a broad ethical domain (e.g. animal welfare, environment and labour conditions). Suppliers often have difficulty complying with the demanding criteria set by case solvers and idealists, as these require specific investments that generally translate into higher prices for consumers (think for example of the premiums charged for organic products). As a consequence, relatively few producers comply with the standards. Those who do comply, generally cater for niche markets for relatively price-insensitive consumers. The schemes developed by Case-solvers and Idealists are therefore typically associated with welfare focus strategies.

By contrast, *size seekers* set relatively low requirements over a broad range of issues. Because these standards require lower specific investments, more suppliers can adopt them. These criteria-formulating organizations often support brand manufacturers (think of Utz Kapeh, which certifies coffee for brands such as Ahold and Sara Lee). They are therefore typically associated with, or even initiated by welfare differentiators (think of Eurep-Gap). In general, all three types of schemes contribute to sustainable development as those that set high criteria have mirror function to the size-seekers. Sustainable development (including animal welfare) is thus best served if these types of organizations co-exist.

Figure 1: Typology of CFOs (Ingenbleek, Binnekamp, and Goddijn 2007)



Finally, there may be criteria-formulating organizations that set low requirements on a single or small range of ethical issues and may be named *low flyers*. Such organizations do not have an idealistic vision on a long-range continuing contribution to society. They may be developed in the past and then laid down in legislation which makes them inflexible to incorporate new insights in animal welfare (Ingenbleek, Binnekamp, and Goddijn 2007). Some of these organizations may even be “window dressers”, as the image they set out to create in their customers’ perceptions is more positive than their standards justify.

Opportunities for Welfare Quality[®]

The primary knowledge generated by Welfare Quality[®] is knowledge on how animal welfare can be measured. Such knowledge is likely to be beneficial to criteria-formulating organizations. In order to make the welfare knowledge compatible with retailers’ demands, criteria-formulating organizations seem to be an important intermediary. Because these organizations set criteria on different aspects of sustainability and at different levels, and because sustainable development is best served by co-existence of different schemes, it is important that if animal welfare is to be improved by the use of market forces: (1) welfare measures are not exclusively provided to a single criteria-formulating organization; and (2) that welfare measures are sufficiently flexible to set criteria at different levels and to trade welfare criteria off against other criteria if they contradict with each other (e.g. with environment in the case of pollution by animals kept outdoors) or contradict with immediate practice at the farm (because specific investments may take time to become profitable).

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Challenges experienced in practice when implementing a welfare Scheme

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and

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McDonald's is very much at the forefront of progressing and improving animal welfare standards. However, we realise that there is still a great deal more to be done as we strive to develop a culture of continuous improvement in our supply base. We believe that sharing information, listening to experts and being transparent are essential to raising standards in animal welfare.

McDonald's Supply Chain

One of McDonald's greatest assets and the main reasons we have been able to develop a truly global restaurant system, is the strength and structure of our supply chain.

The foundation of our supply chain system is partnering, our suppliers have grown with us in new and existing McDonald's markets, and they work hard to apply continuous improvements on our behalf. We involve our suppliers in our business, all the way through to customer delivery.

McDonald's made a conscious decision not to own any part of the supply system. It is therefore an independent system. McDonald's don't breed their own animals – they come from many of the same independent farms that supply many of the best supermarkets across Europe.

We believe this approach delivers the safest, best quality food, produced according to the highest standards. However it does throw up challenges when trying to exercise influence and effect positive change in areas such as animal welfare, a long way back up the supply chain.

Nevertheless, we have a commitment to improving the welfare and sustainability of the animals and farming practices used in our supply chain.

McDonald's Agricultural Assurance Programme

McDonald's Agricultural Assurance Programme (MAAP) was developed five or so years ago as an initiative to increase the company's influence through the supply chain back to the primary producer, and to become more transparent. The programme provides a framework to manage food safety and quality, as well as sustainable and ethical agricultural production methods.

We share our standards with our direct suppliers and with most of the national and local farm assurance schemes that exist around Europe. We do NOT want to create a separate set of standards for McDonald's, or an additional farm audit. Instead we want our requirements to be incorporated into the existing schemes.

We also want to use existing schemes that are independently audited. The reason is that research shows clearly that customers trust independent verifications more than messages from producers or retailers.

Compliance to our MAAP standards is monitored against the requirements for each of our major products in Europe.

A key goal in the development of MAAP has been to ensure that agricultural production is balanced and sustainable, offering farmers longevity in their relationship with McDonald's and our suppliers. This is a key process in our progress towards our vision, particularly in some of the more complex supply chains, like beef.

MAAP is still work in progress and we measure the level of compliance within our supply base on an annual basis and continually strive to increase both standards and compliance. Increasing standards is a never-ending process.

Challenges implementing a welfare scheme

The challenges that we have seen over time to implement our MAAP standards and welfare requirements down the food chain stem from the complexity and diversity of our various supply chains. For example our beef originates from up to 500.000 European farms, many of which are dairy farms supplying the dairy industry and not associated with the beef industry. Our chicken on the other hand originates from about 3,000 different farms that are closely linked with our raw material suppliers, either directly contracted or owned. In the chicken supply chain it is easier to monitor progress better, obtain feedback and work on continuous improvement. This is a lot more difficult in the beef supply chain.

The structure of our supply chain and the size of our company has made it possible however to have some influence.

We also established Technical Advisory Groups for the different product categories (beef, chicken, pork, etc). These groups continually develop and revise our standards for the various product categories. Hence the members sign off the standards before being implemented at supplier level. The members of these groups are subject matter experts both internally and from our largest suppliers, (e.g. for chicken, Veterinarians, Agricultural Directors, Nutritionists etc.)

Included in MAAP and our Chicken Welfare Standard at Slaughterhouses are the monitoring of "Key Welfare Indicators" (KWI), whose aim is to have reliable animal welfare based indicators. The KWI's were established at the end of 2003, and approved by Dr. Temple Grandin, our Chief animal welfare consultant.

The KWIs' relate to both farm management and handling at catching and transportation.

- ◆ Farm management: Footpad lesions, hock burns, breast blisters
- ◆ Catching & Transportation: Bruises, broken or dislocated legs and wings, DOA's

At least 100 birds per flock slaughtered are monitored at the slaughterhouse. Average slaughter weight and age is documented to have background data on issues that can affect the results. Again we will reward suppliers that show consistently good results.

Since starting in 2004, we have seen improvement in nearly all of the indicators (except for footpad lesions, which vary from season to season). More importantly however, the raw material suppliers understand the benefit of having good KWI results and really work hard to improve.

Not only do we monitor KWI's, we have also been monitoring total antibiotic usage since beginning of 2001.

This is reported by mg of active substance/kg live weight. Initially the aim was to control/ prevent the use antibiotic growth promoters, and monitor that the therapeutic antibiotic usage did not increase as a result of the removal of the growth promoters. Today we also restrict the usage of broad-spectrum antibiotics.

Those should only be used after a resistant test has been done and when no other substance is effective against the bacteria. You might not be surprised to hear that our suppliers that use the least antibiotics also tend to have the best KWI figures.

Conclusion

Starting the monitoring was not easy, our suppliers initially objected to the idea, mainly due to increased labour and paper work. So we started slowly knowing that the results were not always totally accurate. However, over time both we and our suppliers understood how to best monitor the KWIs, (although it can be tricky to monitor when you only have a short space available at the hanging line).

Overall these process and results represent the welfare at our suppliers. We like to think that not only has welfare increased in our chicken supply chain, but there have also been some economical benefits for in terms of increased production yield.

Benefits and costs of improved animal welfare

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In his analysis of the economic costs and benefits of animal welfare, Bennet (1997) concludes that "Economic considerations are central to the animal welfare debate and are integral, inescapable aspects of issues concerning the use of animals and of an interdisciplinary inquiry into animal welfare, alongside ethics and animal science". Indeed, when farmers are asked by Welfare Quality's social scientists about the main barriers which need to be overcome to convert to a more welfare friendly system, they generally respond they worry about the costs of additional investment as well as additional running costs. They fear that these costs will eventually negatively influence their income and competitive position. Therefore, for Welfare Quality[®] to succeed, additional information is needed on the impact welfare measures have on production costs.

Improved animal welfare: outweigh negative consequences by positive benefits

A hindrance for farmers to improve farm animal welfare are the perceived negative consequences, mainly due to increased costs for housing. In some cases these welfare friendly housing systems are expected to worsen working conditions and have a detrimental effect to the farmer's health. This, however, sheds light on only one side of the balance. Next to negative farm and farmer consequences, there might be also positive consequences. Measures to improve animal welfare can also have a positive effect on animal productivity (e.g. reproductive performance, weight gain, health status) as well as on product quality (e.g. second quality eggs, lean meat content). There is ample evidence from animal science that various welfare improvement strategies will increase production. Providing pigs with more space will improve growth rate (e.g. Edwards et al., 1988; Gonyou et al., 2005). Commercial broiler chickens which received frequent positive human contact had better food conversion ratios compared to birds without (Gross and Siegel, 1979). Productivity of dairy cows is markedly influenced by the fear of people (gentle vs. aversive handling during milking) (Rushen et al., 1999). When converting to a more animal welfare friendly system, farmers may experience increased job satisfaction related to a different, more zoocentric approach of working with animals (De Jonge et al., 2000). It is interesting to know whether the negative consequences of implementing welfare strategies will be outweighed by the positive benefits through higher efficiency, higher product revenues, and more pleasant working conditions. In the lines below we give a quantitative example on what the economic implications of improved animal welfare might be, and that it not in itself only means increased costs.

Increased space allowance for finishing pigs

Pigs require space to perform their basic needs and activities such as resting, feeding, dunging, exploring, interacting and escaping from interaction with other pigs. The most common way to describe the amount of space offered to pigs is 'space allowance' expressed in m² of floor per pig. A minimum level of space allowance, with reference to the EU Council Directive, is 0.65 m² per pig for pigs up to 110 kg live weight. An increase in space allowance to e.g. 1.0 m² improves the welfare of the pig, but does it also improve the well-being of the farm and farmer? In a research performed by the Animal Sciences Group of Wageningen UR the overall on-farm economic effect of increased space allowance to finishing pigs was assessed, and if the net balance is negative an calculation was made to assess what is necessary to compensate for lost income (Vermeij et al., 2002).

Increasing space allowance from 0.7 m² to 1.0 m³ per pig would, under Dutch circumstances, increase the investment costs for housing from € 455 to € 525 per pig place (including VAT). The running costs for housing (interest, depreciation and maintenance) would therefore increase with € 2,50 per pig, being € 0.03 per kg meat. Larger units need more cleaning time, increasing labour costs and water use. Next to these negative consequences of improving animal welfare, positive benefits were encountered: increased space allowance also resulted in increased productivity (growth: + 24 g/d), increased product quality (carcass classification: -10% B/C) and easier daily control of the pigs. The net balance of the costs and benefits in monetary terms was, however, negative. On the animal productivity site, an additional growth increase of +26 g/d or a feed conversion decrease of 0.13 points would have been necessary to compensate on-farm for the lost income. Unfortunately, the economic value of the easier and more convenient daily control of the pigs was not quantified within the experiment. This contributes to job satisfaction, and could have a value to the farmer in cut cost price allowed equalling the net increased costs of this example.

Recover net costs on consumer?

If in the end the net-balance on farm level is negative, can this then be recovered on society? E.g. on the consumer through higher product prices?

There is evidence from the organic production chain that there are certain possibilities to recover net additional production costs on the consumer. However, an important remark should be made before the conclusion for a niche market, such as organic production, is extrapolated to mass markets. Because, if production will increase from small scale to large scale and achieve the critical mass, there is a possibility that farmers are no longer able to market their product without the label of the specific production system. The price premium received by farmers for their products will then shift into a price deduction for products not fulfilling the requirements.

But, imagine that in mass markets consumers are willing to pay for the costs of improved welfare in the short run. This doesn't mean that they will do so in the long run. Consumer demands increase in time, and what today has additional value to the consumer can be common property in the future. Added value is transitory.

Project to assess on-farm economic implications of improved animal welfare

To stimulate uptake of welfare strategies within the production chain, it is necessary to integrate the benefits and the costs of improved welfare, and explore the market perspectives of such welfare improved products. Therefore, the project "On-farm economic implications of improved animal welfare" was started within Welfare Quality[®] in January 2007. The objectives are:

1. To assess the economic consequences of improving animal welfare at farm level,
2. To assess the minimum product price or income level that would enable farmers to implement animal welfare strategies,
3. To assess to what financial limit farmers are willing to implement welfare strategies that contribute to job satisfaction, and to assess what financial compensation is needed to implement welfare strategies that lead to job dissatisfaction,
4. To explore the perspectives of processors and retailers concerning the marketing of commodities produced under the conditions of a welfare monitoring and labelling system.

Three commodities of animal origin are incorporated: milk, meat and eggs, meaning three farm types: a dairy farm, a pig farm (sows and finishers) and a laying hen farm.

Three European countries are part of the study: Sweden in the North, Italy in the South and The Netherlands in Western Europe. The project elaborates on the results of SubProject 3 of Welfare Quality[®] where practical strategies for improving the welfare of animals are developed. The following welfare problems are incorporated into our project:

- Handling stress in dairy and in pigs,
- Social stress in dairy and in pigs,
- Injurious behaviour in pigs (tail biting) and in laying hens (feather pecking),
- Lameness in dairy cows.

The final results are expected in the first quarter of 2008.

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Biographies of the key speakers and chairs

Bo Algers, VMD, PhD, is professor in Animal Hygiene working at the Department of Animal Environment and Health, Swedish University of Agricultural Sciences. He has spent a 30 year career as a researcher and teacher within the field of animal housing, health, behaviour and welfare. He has performed research on maternal abilities and mother young interactions in pigs, foot and leg disorders in poultry, loose housing of layer birds, etc. He was in the steering board of the Food21 interdisciplinary 8 year research project on sustainable food production and is currently participating in the Welfare Quality project, mainly with welfare indicators at slaughter. He is member of the Animal Welfare Advisory Board of the Swedish Animal Welfare Agency and member of the Animal Health and Animal Welfare expert panel at the European Food Safety Authority.

Harry Blokhuis started scientific work on animal housing and welfare in 1979 at the former DLO-Centre for Poultry Research "Het Spelderholt". From 1989 to 1991 he was head of the Poultry Science Department of this Centre. Since 1991 he was also employed by the former DLO-Institute for Animal Production "Schoonoord", where he was head of the Housing and Management Department. In December 1993 the above-mentioned institutes merged and the Institute for Animal Science and Health (ID-Lelystad) was founded. Harry Blokhuis became head of the department of Behaviour, Stress Physiology and Management of ID-Lelystad and was later leading the research group "Animal Welfare" until June 2002. At present he is manager International Research Networks in the Animal Sciences Group of Wageningen University and Research Centre. He is also professor of Integrated Animal Welfare Science at the Swedish University of Agricultural Sciences. For many years Harry was leader of research programmes for the Dutch Ministry of Agriculture, Nature and Food Quality. These programmes involved the study of housing, stress and animal welfare in cows, pigs and poultry. He also coordinated several EU funded international research programmes. At present Harry Blokhuis is coordinating the EU project Welfare Quality. He is also member of the scientific Panel on Animal Health and Animal Welfare of the European Food Safety Authority.

Dr Ir Bettina B. Bock, is Assistant Professor in Rural Sociology and Rural Gender Studies at Wageningen University, The Netherlands. Her research deals with politics of rural transformation and agricultural change in Europe. In addition she investigates gender-specific patterns of political participation and the gendered impacts of rural development and change. She is engaged in EU funded research regarding animal welfare, food safety and sustainable agriculture. She teaches in political sociology and rural gender studies and supervises several PhD-students in the field of rural governance, rural gender studies and sustainable agriculture.

Bettina is vice-president of the European Society for Rural Sociology and board-member of the International Rural Sociology Association. She chaired the Scientific Committee of the 2005 ESRS conference in Hungary and is chairing the Local Organization Committee of the next ESRS conference to be held in Wageningen in 2007.

Raphaëlle Botreau qualified as an engineer in agronomy in 2004. She is currently employed as a PhD student by Institut de l'Elevage (Dec 2004 – Dec 2007). Her thesis project includes the modelling of the overall assessment of animal welfare (cattle-orientated study), within the European project Welfare Quality®. Her project is co-financed by Welfare Quality® and by Association Nationale de la Recherche Technique. During her PhD project, she is based at the INRA centre of Clermont-Ferrand and she is supervised by Isabelle VEISSIER (from INRA) and by Patrice PERNY (from University Paris 6). She received an award for her presentation of thesis project by her university in 2006.

During her engineer studies, she had participated for 6 months to a French project, conducted by Institut de l'Elevage, on the welfare assessment of cattle: she contributed to the choice and development of measures to assess the welfare of dairy cows at pasture and in barn, including reliability tests. During another training period, she participated during 3 months to a study, conducted at the INRA centre of Tours, on the consequences of very early weaning of piglets on their welfare. After her PhD, she will be on contract with INRA to contribute to the present proposal.

Lawrence Busch is University Distinguished Professor of Sociology and Director of the Institute for Food and Agricultural Standards at Michigan State University. He is coauthor or coeditor of eleven books including Agricultural Standards: The Shape Of The Global Food And Fiber System (Springer, 2005), and most recently, Universities in the Age of Corporate Science: The UC Berkeley–Novartis Controversy (Temple, 2007) as well as more than 150 other publications. He is past president of the Rural Sociological Society, past president of the Agriculture, Food, and Human Values Society and a fellow of the American Association for the Advancement of Science. Several years ago he was named Chevalier de l'Ordre du Mérite Agricole by the French government. Dr. Busch's interests include biotechnology and nanotechnology policy, food and agricultural standards, agricultural science and technology policy, higher education in agriculture, and public participation in the policy process. He is currently working on a general book on the nature of standards.

Dr A. Butterworth BSc(Hons) BVSc PhD CertWel CBiol MiBiol MRCVS is a zoologist and veterinarian with a background in practical assessment of production related disease and welfare related topics. Group project leader at the Veterinary School of Bristol University, he has particular interest in poultry, cattle, sustainable agriculture, welfare assessment and pragmatic improvements in welfare associated with production advances. Dr Butterworth is member of the BVA, BVPA, AWSELVA, BCVA and holder of the royal college of veterinary surgeons certificate in Law & AnimalWelfare science. He has studied, and advised on, production systems in S America, Canada, Asia and Europe.

Ina Enting is a senior researcher Farm Economics at the Animal Sciences Group of Wageningen UR, Lelystad, The Netherlands. She earned her degree in pig husbandry from Wageningen Agricultural University, with a major thesis on Animal Health and Reproduction and a minor on Agricultural Farm Economics. She earned her doctorate at the Faculty of Veterinary Medicine of Utrecht University, The Netherlands. Ms. Enting developed a model for animal health management-support in pig farming. While earning her doctorate, she also contributed to a project involving the reconstruction of the Dutch pig sector. Ms. Enting worked at a feed compounder company, from 1998 until 2000, where she developed an advisory package for technical and commercial field advisors.

Dr Adrian Evans is a research associate on the Welfare Quality® project at the School of City and Regional Planning at Cardiff University. His current research interests include the consumption of welfare-friendly products, the social construction of nature, informal science education, alternative historical geographies of practice; and eighteenth-century material cultures. He has worked as a research assistant on the ESRC's 'science in society' research program (2003-2004). He has held an Economic and Social Research Council Post-doctoral fellowship in Historical Geography at the University of Bristol (2002-2003). His PhD thesis, which was completed in 2001 under the supervision of Dr Paul Glennie, focused on historical geographies of material cultures and consumer practices. He also obtained an Mphil in Environment and Development from Cambridge University (1997).

Since 1999 Dr. med. vet. **Andrea Gavinelli** has been a policy official at the European Commission in charge of developing Community legislation on animal welfare in the framework of the Directorate General for Health and Consumer Protection. From January 2003 he is now leading a team of six officials dedicated to animal welfare that are caring for all the main European initiatives in this area. Since its beginning in 2001 Andrea is active member of the Permanent Working Group on animal welfare of the World Animal Health Organisation (OIE) and he is vice chairman of the Standing Committee of the "European Convention for the Protection of Animals kept for farming purposes" of the Council of Europe. Since 2004 he is member of the Working Group on animal welfare in the framework of the EU Chile Sanitary and Phytosanitary agreement. Andrea Gavinelli has paid particular attention in developing the communication and the relationship with major trading partners of the Community on animal welfare in order to raise awareness on the issue and improve implementation of the OIE standards. Prior to his current position, he was in charge of the negotiations, preparation and enforcement of animal welfare legislation and livestock identification in the Italian Ministry of Health, Rome. He has promoted the first web consultation of the Commission on animal welfare and the last two European wide surveys on the attitudes of consumers towards animal welfare. Born in 1965, he grew up in Novara, Italy, graduated as a veterinary surgeon at the University of Milan with a thesis on the behaviour of dairy calves during the first 30 days of life.

Timoth Hall European Commission, head of unit Agriculture, Forestry, Fisheries and Aquaculture, Directorate Biotechnologies, Agriculture, Food. After obtaining a PhD, T.J. Hall worked as a research scientist for seven years in the UK before moving to DG-Research, European Commission in 1983. For most of the first ten years he worked on science and technology cooperation with developing countries, and in February 1994 was appointed Head of Unit for these activities, a post which he held until December 1998. A move to run one of the horizontal units coordinating the launch and implementation of the Quality of Life RTD Programme followed. From 2001 to September 2006, he was Head of Unit for Strategy and Policy Aspects of Health Research, and for part of this period was Acting Director for Health Research, managing the preparations for the 6th RTD Framework Programme. His main responsibilities included overseeing the implementation of the FP6 Thematic Priority 1 (Life Sciences, Genomics and Biotechnology for Health) and preparing for FP7. His current position (since October 2006) is Head of Unit for Agriculture, Forestry, Fisheries and Aquaculture with primary responsibilities for overseeing the management of projects in these areas supported under FP6, and implementing the Activity "Sustainable production and management of biological resources from land, forest and aquatic environments" in the FP7 Theme "Food, Agriculture and Fisheries, and Biotechnology". This unit also provides the secretariats for the Standing Committee on Agricultural Research (SCAR) and for the European Initiative on Agricultural Research for Development (EIARD).

Professor Dr med. vet. Dr. med. vet. habil. **Jörg Hartung** is a professor for Animal Welfare and for Animal Hygiene and Husbandry at the university of Veterinary Medicine Hannover, Germany. He studied veterinary medicine at FU Berlin. He was group leader at Silsoe Research Institute, UK. Jörg is director of the Institute of Animal Hygiene, Animal Welfare and Behaviour of Farm Animals of the University of Veterinary Medicine Hannover, Germany. He is vice-President of the Scientific Panel for Animal Health and Animal Welfare (PAHAW), EFSA, Parma and he chairs the Federal Committee for Animal Welfare, Federal Ministry of Food, Consumer Protection and Agriculture, Bonn/Berlin, Germany. Jörg is also chief-editor of the German Veterinary Journal (Deutsche Tierärztliche Wochenschrift, DTW).

Albert D. (Aldin) Hilbrands is the Senior Manager Product Safety and Integrity for Royal Ahold based in Amsterdam, The Netherlands. In this job, he oversees the development and implementation of the group-wide Ahold policies in the fields of product safety and sustainability. Previously, he was with the largest independent inspection, verification and testing company SGS (Société Générale de Surveillance) as a manager and auditor of various international food certification programme. Later he became responsible for international sales and account management of the quality assurance services delivered to the food service, food retail and manufacturing industries. He has also worked as a consultant for Agro Eco, a leading company in the field of organic agriculture and was mainly involved in international supply chain projects. Aldin Hilbrands holds a Master of Science degree in Animal Husbandry and the Environment from Wageningen University in The Netherlands. Royal Ahold has food retail operations in the United States and Europe, serving over 2 million customers every week through its supermarket chains Albert Heijn, ICA, Hypernova, Albert, RIMI, GIANT, Stop & Shop, Tops and its US Foodservice operations. Total sales in 2006 were approx. Euro 45 billion.

Patrik Holm Thisner is European Quality Director for Poultry Products within McDonald's Europe. Patrik's responsibility covers the complete food chain and he spends roughly 50/50 for raw material and finished products. He developed the broiler and egg layer standards for McDonald's Agricultural Assurance Programme and has initiated the monitoring of Key Welfare Indicators at McDonald's approved suppliers. He has also been involved in the development of the European Animal Welfare Platform, chaired by Prof. Harry Blokhuis. Patrik holds an MSc in biology, with especial focus on Food Science, from the Swedish University of Agricultural Sciences.

Paul Ingenbleek is assistant professor in marketing and consumer behaviour at Wageningen University and senior researcher in strategic marketing management at the Agricultural Economics Research Institute (LEI-WUR) in the Netherlands. He holds an Msc. degree from Erasmus University Rotterdam in history of society and received a PhD in marketing from Tilburg University (2002). His research interests focus predominantly on the interactions between market forces and sustainable development, like socially responsible consumption and marketing strategies for corporate social responsibility. He is involved in several national and international research projects in this area, with a specific focus on the agro-food business and animal welfare. His work is published or forthcoming in among others *Journal of Business Research*, *Marketing Letters* and *Agribusiness*. See for more information: www.mcb.wur.nl/UK/Staff/Faculty/Ingenbleek/

Linda Keeling received her PhD in Zoology from the University of Edinburgh. Since then she has worked in Scotland, Canada and Sweden and is now Professor of Animal Welfare in the Department of Animal Environment and Health at the Swedish University of Agricultural Sciences. Her research has been mainly in the area of behaviour, asking basic behavioural questions related to social behaviour and motivation, as well as applied questions related to behavioural problems such as feather pecking and cannibalism in poultry and tail biting in pigs. Besides being leader of Subproject 2 in Welfare Quality she is also coordinator of a Nordic research project on horse welfare. She is responsible for education in animal welfare to veterinary, agriculture and biology students at the university.

Keith Kenny is a Senior Director for McDonald's Quality Assurance in Europe. Keith deals with food related issues management and the development and implementation of the company's sustainable sourcing strategy. Keith pioneered the development of the pan-European McDonald's Agricultural Assurance Programme and implementation of McDonald's animal welfare programme including the company's involvement in the research and development of commercially-viable animal welfare farming systems. Keith holds a BSc. (Hons) in Food Science from Kings College London.

Unni Kjærnes, Cand real (nutrition, sociology), is a senior researcher at the National Institute for Consumer Research, Norway. She has published widely on food consumption, focussing on the modernisation of eating habits; food politics, regulation and trust; and public opinions on meat eating and animal welfare, organic food, food safety, etc. Relevant books: *Regulating Markets, Regulating People. On Food and Nutrition Policy* (Novus, Oslo 1993 with L. Holm, M. Ekström, E. Fürst, R. Prättälä); *Eating patterns. A day in the lives of Nordic peoples.* (Report No 7. The National Institute for Consumer Research, Oslo 2001); *Trust in Food in Europe* (London: Palgrave Macmillan, London 2007, with M. Harvey and A. Warde); and *Attitudes of Consumers, Retailers and Producers to Farm Animal Welfare* (Welfare Quality Reports No.2., Cardiff University 2007 with M. Miele and J. Roex , eds.).

Xavier Manteca Vilanova received his BVSc degree from the Autonomous University of Barcelona and a Master's degree in Applied Animal Behaviour and Animal Welfare from the University of Edinburgh. He also has a PhD from the Autonomous University of Barcelona. Currently, he is associate professor at the School of Veterinary Science in Barcelona, where he teaches animal behaviour and animal welfare. His main research interests are animal welfare and feeding and social behaviour of domestic ruminants and pigs. He is the coordinator of Sub-project 3 in Welfare Quality®.

Brian Marchant is a veterinarian, graduating from Edinburgh in 1970, also gaining an MSc in Animal Health in 1980. After 6 years in practice, he worked in the UK State Veterinary Service before moving to the European Commission in 1985. Until 1997 he was responsible for epizootic disease control legislation, including foot and mouth disease and BSE, and he was lead negotiator for animal health issues for the EU veterinary agreements with USA, Canada and New Zealand. He was part of the EU team which negotiated the WTO SPS Agreement. After two years in DG Environment, where he was responsible for marine environmental agreements and for negotiations with the EU candidate countries on implementation of EU legislation on nature conservation, he moved to DG Trade. In this DG, he heads a team of SPS experts, responsible for trade issues in the SPS sector.

Dil Peeling is a veterinarian who has worked for the last 15 years on the policy and institutional aspects of natural resource management, in particular on animal welfare, livestock service delivery and rural development. He also has 9 years experience as a large animal veterinarian in the UK. He has worked within ministries of food and agriculture in Asia, Africa, South America and Europe. He is now Senior Policy Officer for Farm Animal Welfare with Eurogroup for Animals. His career experience includes:

- Animal Welfare;
- Public sector reform;
- Developing policy in the natural resource sector;
- Institutional development;
- Veterinary practice.

Isabelle Veissier (DVM, PhD, HDR) is a research director. She has carried research on cattle and sheep behaviour (social behaviour, weaning, learning, emotions, welfare of animals kept under intensive conditions,) from 1983, with the aim of reconciling animal production and animal welfare by a better understanding of animals' perception of the world and the proposal of welfare friendly farming practices. She was responsible of the working group on 'Measuring welfare' within the COST action 846. With three other French scientists from animal or social sciences, she is in charge of the French scientific network on animal welfare (called AGRIBEA). She represents the International Society for Applied Ethology (ISAE) at the standing committee of the Convention for the protection of farm animals within the Council of Europe. She is a member of the steering committee of the European project WelfareQuality® where she also leads the *Training and Mobility* desk, the demonstration activities, and the construction of the model for overall assessment of animal welfare.

A.J.F. (John) Webster, M.A., Vet MB, PhD, MRCVS, is Professor Emeritus at the University of Bristol. On arrival at Bristol in 1977 he established a unit for the study of animal behaviour and welfare, which now is over 50 strong. He was a founder member of the Farm Animal Welfare Council and first propounded the 'Five Freedoms' which have gained international recognition as standards for defining the elements of good welfare in domestic animals. He is a former President of both the Nutrition Society and the British Society for Animal Science. His book 'Animal Welfare: A Cool Eye towards Eden' was published in 1994 and is still in print. Its successor, 'Animal Welfare: Limping towards Eden' appeared in 2005.

Annexes

Tables of measures developed in Welfare Quality[®] to monitor animal welfare

Beef cattle

FULL monitoring system currently being tested on pilot farms around Europe.

C. Winckler¹, B. Algers², X. Boivin³, A. Butterworth⁴, E. Canal⁵, G. de Rosa⁶, N. Hesse⁷, L. Keeling², U. Knierim⁷, S. Laister¹, K.A. Leach⁴, F. Milard⁸, M. Minero⁵, F. Napolitano⁹, C. Schmied¹⁰, H. Schulze Westerath⁷, S. Waiblinger¹⁰, F. Wemelsfelder⁸, H.R. Whay⁴, I. Windschnurer¹⁰, D. Zucca⁵

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This table lists the measures that are currently part of the full monitoring system for beef cattle. It is not the final monitoring system since when these measures have been recorded on a range of pilot farms around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

Acknowledgments

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	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	On farm: Body condition score (percentage of too thin animals)
	2	Absence of prolonged thirst	On farm: Water supply (number and type of water bowls, functioning of bowls)
Good housing	3	Comfort around resting	On farm: Time needed to lie down Percentage of ruminating and lying animals Cleanliness scores (percentage of too dirty animals)
	4	Thermal comfort	
	5	Ease of movement	At abattoir: Slipping and falling (during unloading, during driving to the stunning box)
Good health	6	Absence of injuries	On farm: Lameness prevalence Integument alterations (hairless patches, lesions/swellings, overgrown claws) At abattoir: Carcass bruising score
	7	Absence of disease	On farm: Respiratory disorders (coughing, sneezing, nasal discharge, ocular discharge, increased respiratory rate) Enteric disorders (diarrhoea, bloated rumen) Other parameters (mortality, culling rate)
	8	Absence of pain induced by management procedures	On farm: Routine mutilations (dehorning, tail docking; procedure, age, use of anaesthetics/analgesics) At abattoir: Stunning effectiveness (eye movements, righting reflex, excessive kicking)
Appropriate behaviour	9	Expression of social behaviour	On farm: Incidence of agonistic behaviours (head butts without displacement, total agonistic behaviours) Incidence of cohesive behaviours (social licking, hornings)
	10	Expression of other behaviours	On farm: Qualitative behaviour assessment
	11	Good human-animal relationship	On farm: Avoidance distance at the feeding place
	12	Absence of general fear	At abattoir: Behaviours indicating fear (moving backwards, freezing, running, vocalizations during unloading and driving to the stunning box)

Dairy cows

FULL monitoring system currently being tested on pilot farms around Europe.

C. Winckler¹, B. Algers², X. Boivin³, A. Butterworth⁴, E. Canal⁵, G. de Rosa⁶, N. Hesse⁷, L. Keeling², U. Knierim⁷, S. Laister¹, K.A. Leach⁴, F. Milard⁸, M. Minero⁵, F. Napolitano⁹, C. Schmied¹⁰, H. Schulze Westerath⁷, S. Waiblinger¹⁰, F. Wemelsfelder⁸, H.R. Whay⁴, I. Windschnurer¹⁰, D. Zucca⁵

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¹⁰VUW. Institute of Animal Husbandry and Animal Welfare. Veterinärplatz 1. 1210 Vienna, Austria.

This table lists the measures that are currently part of the full monitoring system for dairy cows. It is not the final monitoring system since when these measures have been recorded on a range of pilot farms around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

	Welfare Criteria		Measures (all on farm)
Good feeding	1	Absence of prolonged hunger	Body condition score (percentage of too fat/too thin animals)
	2	Absence of prolonged thirst	Water supply (number of water bowls, flow rate, cleanliness, functioning of bowls)
Good housing	3	Comfort around resting	Time needed to lie down Percentage of animals colliding with housing equipment during lying down Percentage of animals lying with hindquarter on edge Cleanliness scores (udder, flank and upper legs, lower legs)
	4	Thermal comfort	
	5	Ease of movement	Presence of tethering Access to outdoor loafing area and/or pasture
Good health	6	Absence of injuries	Lameness score (lameness prevalence) Integument alterations (hairless patches, lesions/swellings, overgrown claws)
	7	Absence of disease	Respiratory disorders (coughing, sneezing, nasal discharge, ocular discharge, increased respiratory rate) Enteric disorders (diarrhoea) Reproductive disorders (milk somatic cell count, vulvar discharge) Other parameters (mortality, culling rate)
	8	Absence of pain induced by management procedures	Routine mutilations (dehorning, tail docking; procedure, age, use of anaesthetics/analgesics)
Appropriate behaviour	9	Expression of social behaviour	Incidence of agonistic behaviours
	10	Expression of other behaviours	Qualitative behaviour assessment
	11	Good human-animal relationship	Avoidance distance at the feeding place Avoidance distance in the home pen

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Veal calves

FULL monitoring system currently being tested on pilot farms around Europe.

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This table lists the measures that are currently part of the full monitoring system for veal calves. It is not the final monitoring system since when these measures have been recorded on a range of pilot farms around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	On farm: Body condition score (percentage of too thin animals) Feed supply on the farm
	2	Absence of prolonged thirst	On farm: Water supply (number and type of drinkers, functioning of drinkers, timing of water supply, cleanliness of drinkers)
Good housing	3	Comfort around resting	On farm: Lying positions Percentage of ruminating and lying animals Cleanliness scores (animal and environment: general assessment of cleanliness)
	4	Thermal comfort	On farm: Relative humidity, temperature, air flow
	5	Ease of movement	On farm: Calves slipping when walking; Slipperiness of the floor

Good health	6	Absence of injuries	On farm: Skin alterations Claws and joint alterations (e.g. overgrown claws, swellings, injuries) Lameness prevalence Tail tip necrosis
	7	Absence of disease	On farm: Respiratory disorders (coughing, increased respiratory rate), ORL disorders (nasal and ocular discharge), Enteric disorders (e.g. manure consistency and abnormalities, bloated rumen), anaemia, dull calves, Mortality At abattoir: Prevalence of pathological changes on lung (pneumonia, pleuritis), abomasum (mucosal lesions) and rumen
	7	Absence of pain induced by management procedures	On farm: Mutilations (tail docking)
Appropriate behaviour	8	Expression of social behaviour	On farm: Social horning Mounting Social licking
	9	Expression of positive behaviours	On farm: Play behaviour (running, jumping, bucking) Maintenance behaviours: stretching, scratching, grooming
	10	Expression of abnormal behaviours	On farm: Abnormal oral behaviours (tongue playing, substrate licking) Cross sucking Urine drinking
	11	Good human-animal relationship	On farm: Reaction to the presence of humans (approach and touch of person)
	12	Absence of general fear	On farm: Reaction to a novel object

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Sows and piglets

FULL monitoring system currently being tested on pilot farms around Europe.

A. Velarde¹, B. Algers², M.B.M. Bracke³, H. Chaloupková⁴, V. Courboulay⁵, R. D'Eath⁶, S.A. Edwards⁷, B. Forkman⁸, R. Geers⁹, N.A. Geverink¹⁰, J.H. Guy⁷, V. Hautekiet⁹, G. Illmann⁴, L. Keeling², V. Lammens¹⁰, P. Lenskens³, M. Meuleman¹⁰, M.C. Meunier-Salaün¹¹, F. Millard⁶, P. Námestková⁴, K. Neuhauserová⁴, A. van Nuffe¹⁰, C.G. van Reenen¹⁰, K. Scott⁷, M. Spinka⁴, H.A.M. Spolder³, L. Van Steenbergen⁹, S. Turner⁶, F.A.M. Tuytens¹⁰, K. Vermeulen⁹, F. Wemelsfelder⁶ and A. Dalmau¹

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This table lists the measures that are currently part of the full monitoring system for sows and piglets. It is not the final monitoring system since when these measures have been recorded on a range of pilot farms around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

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	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	Sows: Body condition score Management feeding Piglets: Age of weaning
	2	Absence of prolonged thirst	Sows and piglets: Water supply (number of drinkers, flow rate)
Good housing	3	Comfort around resting	Sows: Pressure injuries
	4	Thermal comfort	Sows and piglets: Percentage of animals shivering Percentage of animals panting Degree of social thermoregulation/huddling Environmental temperature
	5	Ease of movement	Sows: Total pen space and stocking density Presence and size of stalls Presence and size of farrowing crates
Good health	6	Absence of injuries	Sows and piglets: Lameness score Non-fighting wounds on body
	7	Absence of disease	Sows and piglets: Respiratory problems (coughing, sneezing, pumping, twisted snouts) Enteric problems (rectal prolapse, scouring, constipation, hygiene of pigs) Neurological problems (tremor...) Health management strategy Management of sick animals Criteria for euthanasia Hygiene/cleaning routine Sows: Reproductive problems (Metritis, mastitis, uterine prolapse)
	8	Absence of pain induced by management procedures	Sows: Mutilations (nose ringing, tail docking) Piglets: Mutilations (castration, tail docking, teeth clipping)
Appropriate behaviour	9	Expression of social behaviours	Sows: Fighting wounds on body
	10	Expression of other behaviours	Sows and piglets: Environmental enrichment Sows: Stereotypies Qualitative assessment
	11	Good human-animal relationship	Sows: Fear of humans

Fattening pigs

FULL monitoring system currently being tested on pilot farms and abattoirs around Europe.

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This table lists the measures that are currently part of the full monitoring system for fattening pigs. It is not the final monitoring system since when these measures have been recorded on a range of pilot farms around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	On Farm: Body condition score Feeding management
	2	Absence of prolonged thirst	On Farm and at abattoir: Water supply (number of drinkers, flow rate)
Good housing	3	Comfort around resting	On Farm: Pressure injuries At Abattoir: Density and flooring of lorries Density and flooring of lairage pens
	4	Thermal comfort	On Farm and at abattoir: Percentage of animals shivering Percentage of animals panting Degree of social thermoregulation /huddling Environmental temperature
	5	Ease of movement	On Farm: Total pen space and stocking density At Abattoir: Percentage of pigs that slip during unloading Percentage of pigs that fall during unloading

Good health	6	Absence of injuries	On Farm: Non-fighting wounds on body Lameness score At Abattoir: Skin lesions Lameness score
	7	Absence of disease	On Farm: Respiratory problems (coughing, sneezing, pumping, twisted snouts) Enteric problems (rectal prolapse, scouring, constipation, hygiene of pigs) Neurological problems (tremor...) Skin condition Apathic behaviour Ruptures/hernias Health management strategy Management of sick animals Criteria for euthanasia Hygiene/cleaning routine At Abattoir: Percentage of sick animals on arrival Percentage of dead animals on arrival Slaughter checks (pneumonia, pleurisy, pericarditis, white spots in the liver)
	8	Absence of pain induced by management procedures	On Farm: Mutilation (castration, tail docking) At Abattoir: Stunning effectiveness (presence of corneal reflex, righting reflex, rhythmic breathing, vocalisations)
Appropriate behaviour	9	Expression of social behaviours	On Farm: Fighting wounds on body Belly nosing Positive social behaviours (sniffing, nosing, licking) Negative social behaviours (aggressions, biting)
	10	Expression of other behaviours	On Farm: Qualitative assessment Exploratory behaviour Environmental enrichment
	11	Good human-animal relationship	On Farm: Fear of humans At Abattoir: High pitched vocalisations when driven to the stunning area
	12	Absence of general fear	At Abattoir: Reluctance to move during unloading Turning back during unloading

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Broilers

FULL monitoring system currently being tested on pilot farms and slaughterhouses around Europe.

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This table lists the measures that are currently part of the full monitoring system for broiler chicken. It is not the final monitoring system. When these measures have been recorded on a range of pilot farms and slaughterhouses around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	Farm: Feeder space, placement of resources, feeder alarms Slaughter: Emaciated birds (%), feed withdrawal and journey times
	2	Absence of prolonged thirst	Farm: Drinker space, drinker alarms Slaughter: Dehydrated carcasses, water withdrawal and journey times
Good housing	3	Comfort around resting	Farm: Plumage cleanliness, litter quality, floor area, atmospheric ammonia
	4	Thermal comfort	Farm: Panting (hot), social thermoregulation huddling (cold) behaviours, ventilation, humidity, temperature alarms Slaughter: Dead on arrival, panting in lairage
	5	Ease of movement	Farm: Gait score, stocking density Slaughter: Stocking density in transport crates

Good health	6	Absence of injuries	Farm: Foot pad dermatitis, hock burn, breast burn, predator protection, cover on the range Slaughter: Skin damage, foot and toe damage, limb fractures, comb wounds, feather damage
	7	Absence of disease	Farm: Biosecurity measures, dust sheet test, skin pathologies, mortality, culls, inspection routines, disease and treatment records, time spent by stockman inspecting birds, culls, method of culling, inspection routines, treatment records, animal inspection time and ratio of animals to stockman, eye pathologies, spinal lesions, enlarged crop, nasal discharge, diarrhoea Slaughter: Enlarge crop, ascites, dermatitis/cellulites, emaciation, hepatitis, jaundice, pericarditis, septicaemia
	8	Absence of pain induced by management procedures	Farm: Effectiveness of perimeter fencing Slaughter: Birds flapping on the shackle line, birds receiving pre stun shocks, birds not effectively stunned
Appropriate behaviour	9	Expression of social behaviours	Farm: Huddling, enrichment measures, aggressive behaviours
	10	Expression of other behaviours	Farm: Qualitative assessment, novel object test (test of fearfulness), natural light, enrichment measures, cover on the range
	11	Good human-animal relationship	Farm: Touch test, avoidance distance test, time spent by stockman inspecting birds

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Layers

FULL monitoring system currently being tested on pilot farms around Europe.

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This table lists the measures that are currently part of the full monitoring system for broiler chicken. It is not the final monitoring system. When these measures have been recorded on a range of pilot farms and slaughterhouses around Europe, the list will be revised and reduced. The measures are a combination of animal-based, resource-based and management-based measures.

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	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	Farm: Feeder space, placement of resources, correct use and maintenance of resources, modification of resources with intention to improve animal welfare, feeder alarms
	2	Absence of prolonged thirst	Farm: Drinker space, drinker alarms
Good housing	3	Comfort around resting	Farm: Plumage cleanliness, litter quality, useable area (both cage and non-cage systems), style (type of flooring) and state of repair in perforated floors, characteristics of perches
	4	Thermal comfort	Farm: Panting (hot), social thermoregulation huddling (cold) behaviours, ventilation, humidity, temperature alarms
	5	Ease of movement	
Good health	6	Absence of injuries	Farm: Foot pad dermatitis (foot score), predator protection, boundary fence effectiveness, cover on the range, culls
	7	Absence of disease	Farm: Biosecurity measures, dust sheet test, foot pad dermatitis, skin wounds, plumage cleanliness, mortality, culls, inspection routines, disease and treatment records, time spent by stockman inspecting birds, parasites (skin parasites, red mite infestation), keel score, comb score & comb wounds, hospitalisation of birds
	8	Absence of pain induced by management procedures	Farm: Beak trimming severity, beak shape
Appropriate behaviour	9	Expression of social behaviours	Farm: Huddling, enrichment measures, aggressive behaviours, possibility for birds to escape aggressive behaviours
	10	Expression of other behaviours	Farm: Qualitative assessment, novel object test (test of fearfulness), natural light, spectral & flicker frequency of light, enrichment measures, characteristics of single and group nests and their use by birds
	11	Good human-animal relationship	Farm: Touch test, avoidance distance test, time spent by stockman inspecting birds, husbandry test, stockman interaction observation and questionnaire

Training and mobility

Several horizontal activities have been designed to support the research activities of Welfare Quality[®]. One of them is a *Training and mobility* desk which aims to facilitate the laboratory training of research staff. This activity is mainly targeted at young researchers, especially those looking for a postgraduate or a post-doctoral position.

We all know how a challenging task it is to carry research projects. Although scientific knowledge and many techniques can be learned at school and university, the most effective ways of organising research and your time are acquired in the laboratory. Also some people may have to accept from such experience that research is not really their thing. For these reasons, to find a training lab for a student or a young researcher as well as to find the right person to do a research task are extremely important.

The *Training and mobility* desk helps young researchers build and realise their professional plan in animal welfare. Information is provided on the areas of expertise of the partners of Welfare Quality[®] and of the former COST Action *Measuring and monitoring farm animal welfare* (COST Action 846), on potential sources for financial support, and on associated considerations, such administrative constraints for positions abroad. This information is provided on the website of WelfareQuality[®] (address below). As a first step a Self-Evaluation-Questionnaire is used to help applicants check if they are ready or suitable for a career in research. Individual follow-ups are then proposed. Firstly, undergraduate students are provided with information on available PhD positions in accordance with their actual expertise and motivations. Secondly, more experienced researchers receive focused individual evaluation and assessment of personal skills, motives and plans by an external company specialising in the training and recruitment of qualified personnel (APEC, France). This help is given free of charge within the budget limits of Welfare Quality[®].

The *Training and mobility* desk can also help host institutions to refine their needs in terms of human potential and to find competent young researchers. For partners of Welfare Quality[®], this sort of support is free of charge. For other groups, the cost depends on the number of applications we have to deal with, but is generally about 1500 €.

Thirty young researchers have already contacted the *Training and mobility* desk from which 25 received follow-up assistance. Fourteen found a PhD or post doc position directly (10) or indirectly (4) because of the support from the *Training and mobility* desk. We helped to select candidates for 7 positions (1 master's position, 4 PhDs, 1 post-doc). Both the candidates and the host institutions reported that they greatly appreciated the professional help received from the *Training and mobility* desk.

For more information and contact with the *Training and Mobility* desk: visit

<http://www.welfarequality.net/everyone/27181>

or contact Isabelle VEISSIER (veissier@clermont.inra.fr)

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Applied Research, Animal Sciences Group, Wur, The Netherlands	www.pv.wageningen-ur.nl
Cardiff University, United Kingdom	www.cf.ac.uk
Centro Ricerche Produzioni Animalia SpA, Italy	www.crpa.it
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Colophon



This report is an official deliverable of the Welfare Quality[®] project.

Welfare Quality[®] is a European research project focussing on the integration of animal welfare in the food quality chain: from public concern to improved welfare and transparent quality.

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